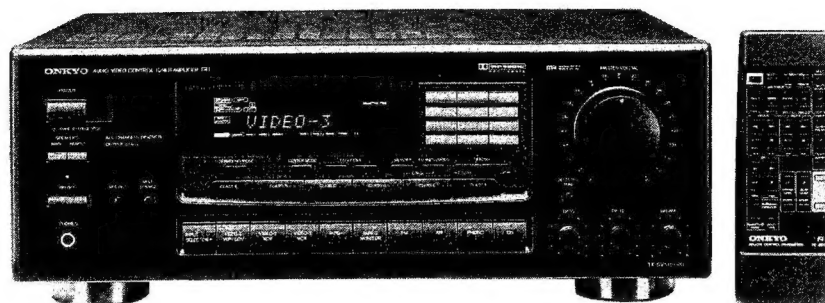


# ONKYO SERVICE MANUAL

## QUARTZ SYNTHESIZED TUNER AMPLIFIER

MODEL TV-014500-11



Black model

BHMD, BHMDN, BHMDL	120V AC, 60Hz
BHMP	230V AC, 50Hz
BHMW	120/220V AC, 50/60Hz
BHMQA	240V AC, 50Hz

**SAFETY-RELATED COMPONENT WARNING!!**  
COMPONENTS IDENTIFIED BY MARK  $\Delta$  ON THE SCHEMATIC DIAGRAM AND IN THE PARTS LIST ARE CRITICAL FOR RISK OF FIRE AND ELECTRIC SHOCK. REPLACE THESE COMPONENTS WITH ONKYO PARTS WHOSE PART NUMBERS APPEAR AS SHOWN IN THIS MANUAL.  
MAKE LEAKAGE-CURRENT OR RESISTANCE MEASUREMENTS TO DETERMINE THAT EXPOSED PARTS ARE ACCEPTABLY INSULATED FROM THE SUPPLY CIRCUIT BEFORE RETURNING THE APPLIANCE TO THE CUSTOMER.

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**ONKYO®**  
**AUDIO COMPONENTS**

# SPECIFICATIONS

## AMPLIFIER SECTION

### Power Output:

#### Stereo mode

##### Front L/R channels

80 watts per channel min. RMS. at 8 ohms, both channels driven, from 20 Hz to 20,000 Hz, with no more than 0.08% total harmonic distortion.

##### Continuous Power output:

2 × 115 watts 4 ohms 1 kHz DIN

2 × 90 watts 8 ohms 1 kHz DIN

#### Surround mode and Multi source mode

##### Front L/R and center channels

55 watts per channel min. RMS. at 8 ohms 1,000 Hz, with no more than 0.08% total harmonic distortion.

##### Rear or Remote channels

20 watts per channel min. RMS. at 8 ohms 1,000 Hz, with no more than 0.8% total harmonic distortion.

### Total Harmonic Distortion:

0.08% at rated power (FRONT)

### IM Distortion:

0.08% at rated power (FRONT)

### Damping Factor:

60 at 8 ohms (FRONT)

### Sensitivity and Impedance:

Phono: 2.5 mV/50 kohms

CD/Tape Play: 150 mV/50 kohms

Tape Rec: 150 mV/2.2 kohms

### Phono Overload:

120 mV RMS. at 1,000 Hz, 0.5% THD.

### Frequency Response:

20 to 30,000 Hz,  $\pm 1$  dB

### RIAA Deviation:

20 to 20,000 Hz,  $\pm 0.8$  dB

### Tone Control:

BASS:  $\pm 10$  dB at 100 Hz

TREBLE:  $\pm 10$  dB at 10,000 Hz

### Signal to Noise Ratio:

PHONO: 80 dB (IHF A, 5 mV input)

CD/TAPE: 100 dB (IHF A)

### Muting:

$-\infty$  dB

## VIDEO SECTION

### Signal sensitivity and impedance

VDP/VCR input, output: 1 Vp-p, 75 ohms

## TUNER SECTION

### FM: (other models)

#### Tuning Range:

87.5 — 108.0 MHz (50 kHz steps)

#### Usable Sensitivity:

Mono: 11.2 dBf, 1.0  $\mu$ V, 75 ohms  
0.9  $\mu$ V (S/N 26 dB, 40 kHz Devi.)  
75 ohms DIN

Stereo: 18.0 dBf, 2.2  $\mu$ V, 75 ohms  
23  $\mu$ V (S/N 46 dB, 40 kHz Devi.)  
75 ohms DIN

#### 50dB Quieting Sensitivity:

Mono: 18.0 dBf, 2.2  $\mu$ V, 75 ohms  
Stereo: 37.2 dBf, 20  $\mu$ V, 75 ohms

#### Capture Ratio:

1.5 dB

#### Image Rejection Ratio:

85 dB

#### IF Rejection Ratio:

90 dB

#### Signal-to-Noise Ratio:

Mono: 73 dB

Stereo: 67 dB

#### Selectivity:

50 dB DIN ( $\pm 300$  kHz, 40 kHz Devi.)

#### AM Suppression Ratio:

50 dB

#### Harmonic Distortion:

Mono: 0.15 %

Stereo: 0.25 %

#### Frequency Response:

30 — 15,000 Hz  $\pm 1.5$  dB

#### Stereo Separation:

45 dB at 1 kHz

### AM:

#### Tuning Range:

European models

522 — 1611 kHz (9 kHz steps)

USA, and Canadian models

530 — 1710 kHz (10 kHz steps)

Saudi Arabia and worldwide models

531 — 1602 kHz (9 kHz steps)

#### Usable Sensitivity:

30  $\mu$ V

#### Image Rejection Ratio:

40 dB

#### IF Rejection Ratio:

40 dB

#### Signal-to-Noise Ratio:

40 dB

#### Total Harmonic Distortion:

0.7 %

## TUNER SECTION

### FM: (120V model)

#### Tuning Range:

87.5 — 108.0 MHz (50 kHz steps)

#### Usable Sensitivity:

Mono: 11.2 dBf, 2.0  $\mu$ V

Stereo: 17.2 dBf, 4.0  $\mu$ V

#### 50dB Quieting Sensitivity:

Mono: 17.2 dBf, 4.0  $\mu$ V

Stereo: 37.2 dBf, 40  $\mu$ V

#### Capture Ratio:

1.5 dB

#### Image Rejection Ratio:

40 dB

#### IF Rejection Ratio:

90 dB

#### Signal-to-Noise Ratio:

Mono: 73 dB

Stereo: 67 dB

#### Alternate Channel Attenuation:

55 dB

#### AM Suppression Ratio:

50 dB

#### Total Harmonic Distortion:

Mono: 0.15%

Stereo: 0.25%

#### Frequency Response:

30 — 15,000 Hz  $\pm 1.5$  dB

#### Stereo Separation:

45 dB at 1 kHz/30 dB

at 100 — 10,000 Hz

#### Muting Level:

17.2 dBf, 4.0  $\mu$ V

## GENERAL

### Dimensions (W × H × D):

455 × 170 × 388 mm

17-15/16" × 6-11/16" × 15-5/16"

### Weight:

13.5 kg (29.8 lbs)

## SERVICE PROCEDURES

### 1. Replacing the fuses

For continued protection against fire hazard, replace only with same type and same rating fuse.

Circuit no.	Part no.	Description
F901	252166Y	△6.3A-UL/T-237,Primary fuse <D/W>
F902	252076	△3.15A-SE-EAK,Primary fuse <P/W/Q>
F903	252075	△2.5A-SE-EAK,AC outlet fuse <P>
F911,F912	252166Y	△6.3A-UL/T237,Secondary fuse <D>
	252079	△6.3A-SE-EAK,Secondary fuse <P/W/Q>

NOTE: <D> :Only 120V model  
 <P> :Only 230V model  
 <W> :Only Worldwide model  
 <Q> :Only 240V model

### 2. Change of FM/AM band step.

With the exception of the Worldwide model, a BAND STEP selector switch is not provided.

(AM)

BAND STEP	R724	D711
10kHz→9kHz	Addition	Addition
9kHz→10kHz	Eliminated	Eliminated

In R724 Carbon resistor 1 kΩ

(Part No.417341024) is used.

In D711 Diode 1SS270A

(Part No.223205) is used.

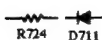
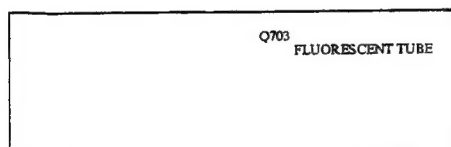
— Worldwide model —

Worldwide models are equipped with a step band selector switch. This switch is located on the back panel. This switch is set to 9kHz (AM) at the factory, but may have to be reset to 10kHz depending on the area where the unit is used.

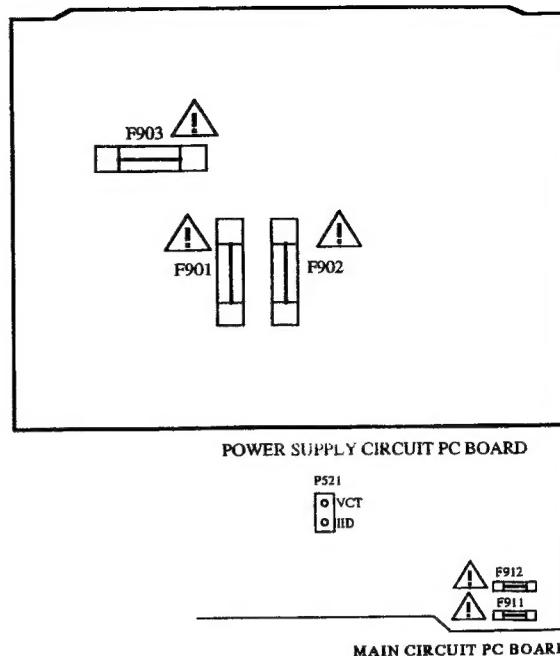
AM step

Europe: 9kHz

U.S.A: 10kHz



DISPLAY CIRCUIT PC BOARD



### 3. Memory preservation

This unit does not require memory preservation batteries. A built-in memory power back-up system preserves contents of the memory during power failures and even when the unit is unplugged. The unit must be plugged in and the power switch turned on and off once in order to charge the back-up system. Note that since this is not a permanent memory the power switch must be turned on and off a few times each month to keep the back-up system operative. The period of time during which memory contents are preserved after power has last been turned off varies depending on climate and placement of the unit. On the average, memory contents are protected over a period of 3 to 4 weeks (a minimum of 2 weeks) after the last time power has been turned off. This period is shorter when the unit is exposed to very high humidity or used in an area with an extremely humid climate.

### 4. Safety-check out

(Only U.S.A. model)

After correcting the original service problem perform the following safety check before releasing the set to the customer.

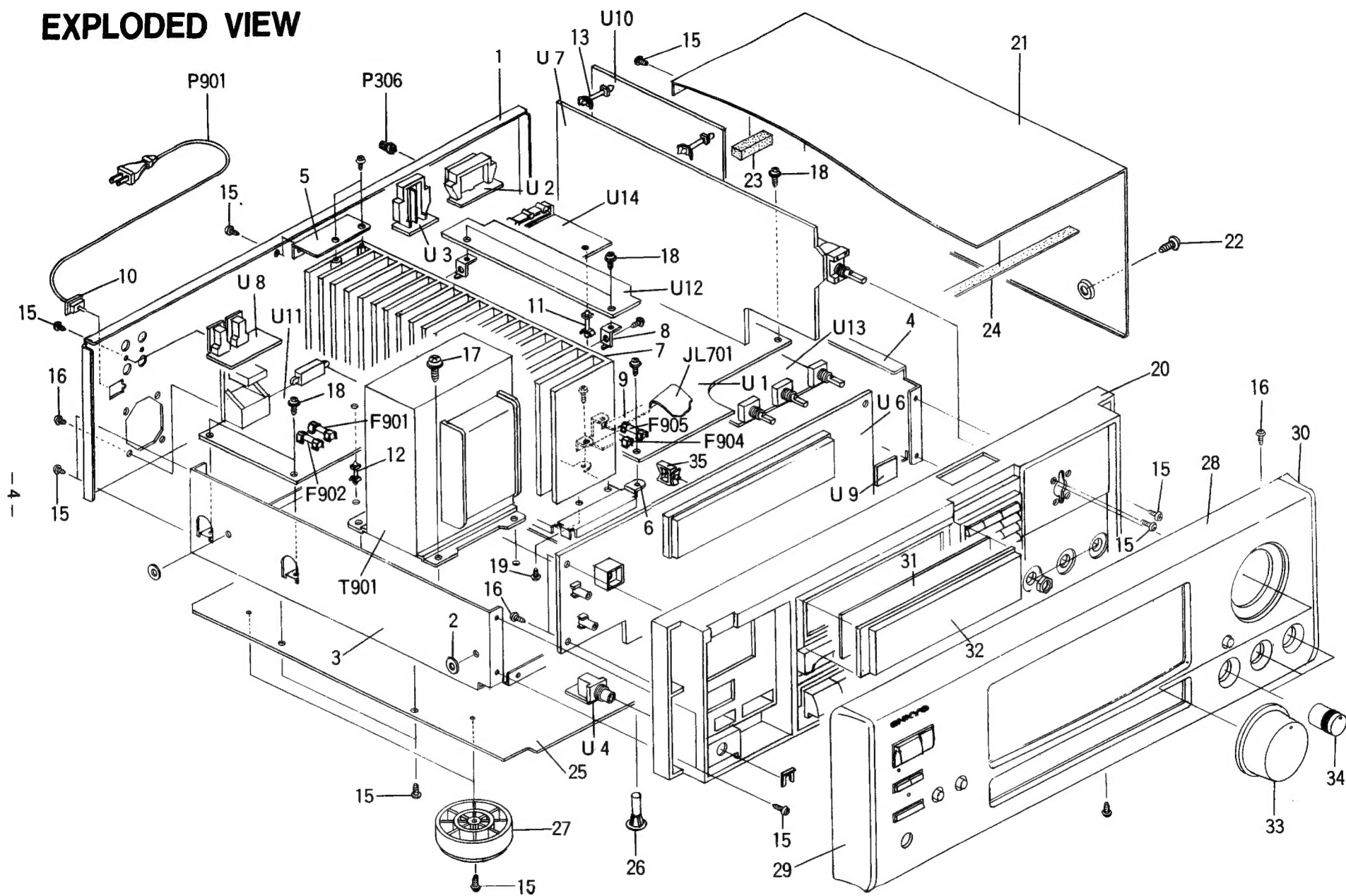
Connect the insulating-resistance tester between the plug of power supply cord and terminal GND on the back panel. Specifications: 3.3 Mohm ±10% at 500V.

### 5. Change of voltage

Worldwide models are equipped with a voltage selector to conform with local power supplies. This switch is located on the back panel. Be sure to set this switch to match the voltage of the power supply in your area before turning the power switch on.

This switch is set to 220V at the factory. Voltage is changed by sliding the groove in the switch with the screw-driver to the right or left. Confirm that the switch has been moved all the way to the right or left before turning the power switch on.

## EXPLODED VIEW



# PARTS LIST

REF.NO.	PART NO.	DESCRIPTION
1	27121706AY	Rear panel <D>
	27121707AY	Rear panel <P>
	27121708AY	Rear panel <W>
	27121709AY	Rear panel <Q>
	27121710AY	Rear panel <PX>
2	27270212	Spacer <P/W/Q>
3	27130717AY	Bracket,power transformer
4	27115255Y	Side bracket
5	27141607Y	Retainer H
6	27130718Y	Bracket H
7	27160323Y	Radiator
8	27141530A	Retainer HS-2
9	27141532	Retainer PD-1
10	27300750	△ Cord,bushing
11	27190369	KGLS-22S,Holder
12	27190480	KGLS-8S,Holder
13	27190062	KGLS-12S,Holder
14	801433	3SMS8W.SW+14B(BC),Sems screw
15	834430088	3TTS+8B(BC),Self-tapping screw
16	833430080	3TTP+8P(BC),Self-tapping screw
17	830440089	4TTC+8C(BC),Self-tapping screw
18	831130088	3TTW+8B,Self-tapping screw
19	834430108	3TTS+10B(BC),Self-tapping screw
20	27110754CY	Front bracket ass'y
21	28184535Y	Top cover
22	838440089	4TTB+8C(BC),Self-tapping screw
23	28141132	61×60×10,Cushion
24	28140546Y	0.51×390×10,Cushion
25	27170300AY	Bottom panel
26	27190926	KGLS-18RF,Holder
27	27175251AY	Leg
28	1A425701K	Front panel ass'y
29	28125251AY	End cap L
30	28125252AY	End cap R
31	28191661	Clear plate
32	28133299Y	Back plate
33	28324775	Knob VOLUME
34	28324376A	Knob TONE
35	260220	WS-3NS,Clamp
F901	252166Y	△ 6.3A-UL/T-237,Primary fuse <D/W>
F902	252076	△ 3.15A-SE-EAK,Primary fuse <P/W/Q>
F903	252075	△ 2.5A-SE-EAK,Primary fuse <P>
F911,F912	252166Y	△ 6.3A-UL/T-237,Secondary fuse <D>
	252079	△ 6.3A-SE-EAK,Secondary fuse <P/W/Q>
JL701	2041322010 or 2047322012Y	NCFC1-322010 or NCFC7-322012,Flexible flat cable
P306	25060044	Terminal,ground

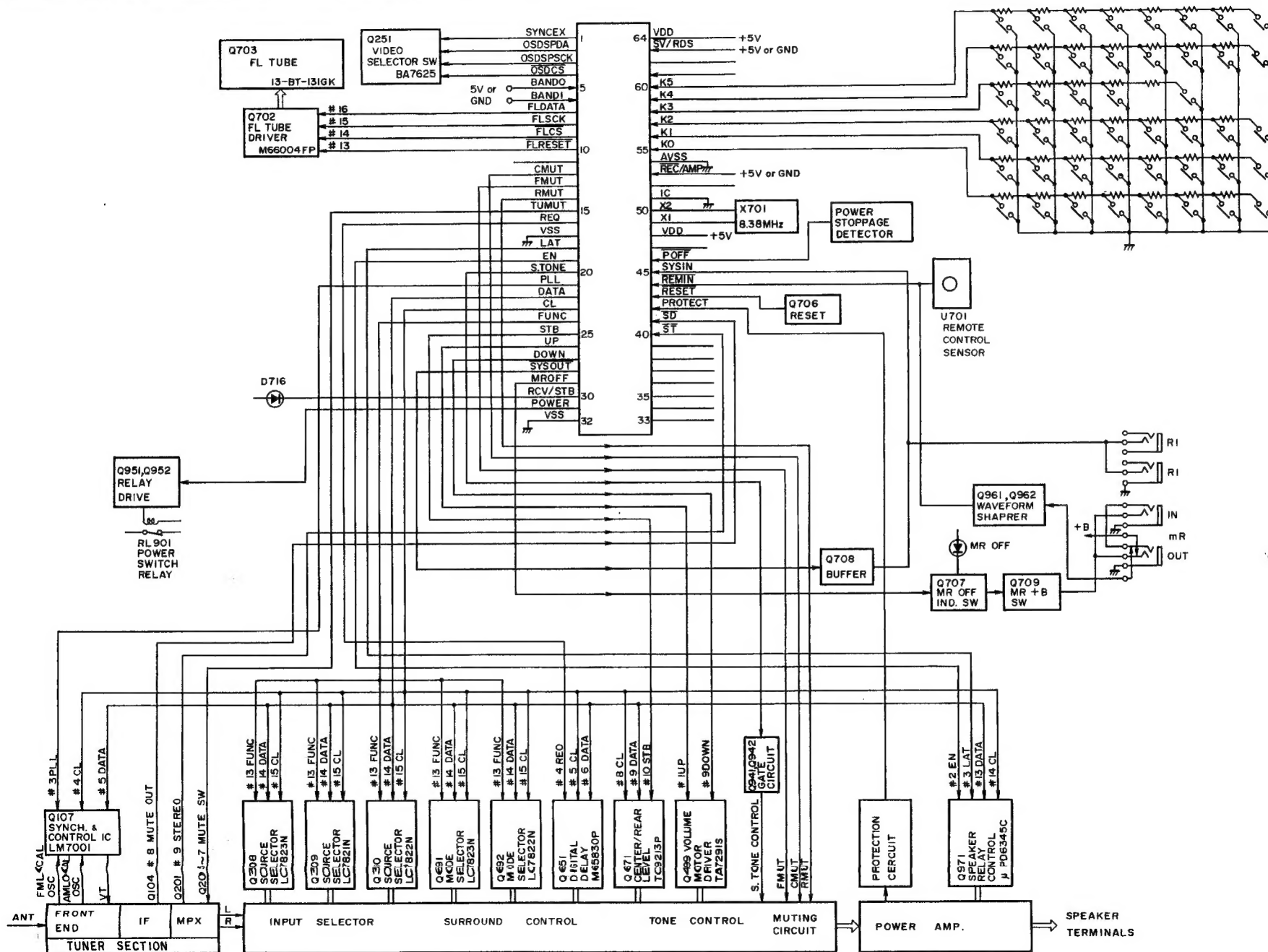
REF.NO.	PART NO.	DESCRIPTION
P901	253163Y or 253174Y	△ AS-UC-6 #18, △ Power supply cord <D/PX>
	253164Y or 253175Y	△ AS-CEE, △ Power supply cord <P>
	253170	△ AS-SAA,Power supply cord <Q>
	253172 or 253092-1A	△ AS-CEE-2, △ Power supply cord <W>
P902,P903	25050904	△ NSCT-2P697,AC outlet <Q>
Q505,Q506	2201653, 2201654, 2201655,	* 2SC3856-O, * 2SC3856-Y, * 2SC3856-P,
	2202272 or 2202273	* 2SC3907-R or * 2SC3907-O,Power transistors
Q507,Q508	2201663, 2201664, 2201665,	* 2SA1492-O, * 2SA1492-Y, * 2SA1492-P,
	2202262 or 2202263	* 2SA1516-R or * 2SA1516-O,Power transistors
Q543	2202253, 2202254, 2202256,	* 2SC4467-O, * 2SC4467-Y, * 2SC4467-P,
	2202502 or 2202503	* 2SC3182N-R or * 2SC3182N-O,Power transistor
Q544	2202243, 2202244, 2202246,	* 2SA1694-O, * 2SA1694-Y, * 2SA1694-P,
	2202492 or 2202493	* 2SA1264N-R or * 2SA1264N-O,Power transistor
Q575,Q576	2202063, 2202064 or 2202066	* 2SC4511-O, * 2SC4511-Y or * 2SC4511-P,Power transistors
Q577,Q578	2202053, 2202054 or 2202056	* 2SA1725-O, * 2SA1725-Y or * 2SA1725-P,Power transistors
T901	2300891Y 2300892Y 2300893Y	△ NPT-1168D,Power transformer <D> △ NPT-1168P,Power transformer <P> △ NPT-1168DG,Power transformer <W>
	2300894Y	△ NPT-1168Q,Power transformer <Q>
U1	1A425592-1	NAAR-4692-1,Main circuit pc board ass'y <D>
	1A425592-1A	NAAR-4692-1A,Main circuit pc board ass'y <P/W/Q>
U2	1A425593-1	NAETC-4693-1,Center speaker pc board ass'y <D>
	1A425593-1A	NAETC-4693-1A,Center speaker terminal pc board ass'y <P/W/Q>

REF.NO.	PART NO.	DESCRIPTION
U3	1A425594-1	NAETC-4694-1,Speaker terminal pc board ass'y <D>
	1A425594-1A	NAETC-4694-1A,Speaker terminal pc board ass'y <P/W/Q>
U4	1A425595-1	NAETC-4695-1,Headphone terminal pc board ass'y
U6	1A425597-1	NADIS-4697-1,Display circuit pc board ass'y <D>
	1A425597-1A	NADIS-4697-1A,Display circuit pc board ass'y <P/Q>
	1A425597-1B	NADIS-4697-1B,Display circuit pc board ass'y <W>
U7	1A425598-1	NAAF-4698-1,Surround circuit pc board ass'y
U8	1A425599-1	NAETC-4699-1,RI/MR terminal pc board ass'y <D/P/Q>
	1A425599-1B	NAETC-4699-1B,RI/MR terminal pc board ass'y <W>
U9	1A425500-1	NASW-4700-1,STC switch pc board ass'y
U10	1A425501-1	NARF-4701-1,Tuner circuit pc board ass'y <D>
	1A425501-1A	NARF-4701-1A,Tuner circuit pc board ass'y <P/Q>
	1A425501-1B	NARF-4701-1B,Tuner circuit pc board ass'y <W>
U11	1A425502-1	NAPS-4702-1,Power supply circuit pc board ass'y <D>
	1A425502-1A	NAPS-4702-1A,Power supply circuit pc board ass'y <P>
	1A425502-1B	NAPS-4702-1B,Power supply circuit pc board ass'y <W>
	1A425502-1C	NAPS-4702-1C,Power supply circuit pc board ass'y <Q>
	1A425502-1D	NAPS-4702-1D,Power supply circuit pc board ass'y <PX>
U12	1A425503-1	NAAF-4703-1,Rear amplifier pc board ass'y <D>
	1A425503-1A	NAAF-4703-1A,Rear amplifier pc board ass'y <P/W/Q>
U13	1A425504-1	NAAF-4704-1,Tone control circuit pc board ass'y
U14	1A425505-1	NAETC-4705-1,Video circuit pc board ass'y

NOTE: <D>:120V model only  
<P>:230V model only  
<W>:Worldwide model only  
<Q>:240V model only  
<PX>:PX model only

NOTE: THE COMPONENTS IDENTIFIED BY MARK △  
ARE CRITICAL FOR RISK OF FIRE AND  
ELECTRIC SHOCK. REPLACE ONLY WITH  
PART NUMBER SPECIFIED.

## MICROPROCESSOR DESCRIPTIONS



## Terminal Description

Pin No.	Function	I/O	Description												
1	SYNCEX	O	Video signal control A output terminal.												
2	OSDSPDA	O	Video signal control D output terminal.												
3	OSDSPSCK	O	Video signal control B output terminal.												
4	OSDCS	O	Video signal control C output terminal.												
5	BAND0	I	Initializing input terminal for FM/AM band region.												
6	BAND1	I													
7	FLSDATA	O	Connect to the terminal SDATA of Fluorescent tube driver M66004FP. (Q702)												
8	FLSCK	O	Connect to the terminal SCK of Fluorescent tube driver M66004FP.												
9	FLCS	O	Connect to the terminal CS of Fluorescent tube driver M66004FP.												
10	FLRST	O	Connect to the terminal RESET of Fluorescent tube driver M66004FP.												
11	PLAYER	O	Player control output terminal. Not used.												
12	CENTMUT	O	Muting output terminal for the center amplifier.												
13	FRONTMUT	O	Muting output terminal for the front amplifier.												
14	REARMUT	O	Muting output terminal for the rear amplifier.												
15	TU MUT	O	Muting output terminal for the tuner.												
16	REQ	O	Connect to the terminal REQ of Digital delay M65830P.(Q651)												
17	VSS	-	Ground terminal												
18	LAT	O	Connect to the terminal LAT of Output extended IC $\mu$ PD6345C.(Q971)												
19	EN	O	Connect to the terminal EN of Output extended IC $\mu$ PD6345C.												
20	S.TONE	O	Selective tone control output terminal.												
21	PLL	O	Connect to the terminal CE of PLL IC.(Q107)												
22	DATA	O	Connect to the terminal DI of Analog switches LC7821N,LC7822N, and LC7823N, the terminal DATA of PLL IC LM7001, the terminal DATA of Electro volume TC9213P, the terminal DATA of Digital delay M65830P, and the terminal SIN of Output extended IC $\mu$ PD6345C.												
23	CL	O	Connect to the terminal CL of Analog switches LC7821N,LC7822N, and LC7823N, the terminal CL of PLL IC LM7001, the terminal CK of Electro volume TC9213P, the terminal SCK of Digital delay M65830P, and the terminal SCK of Output extended IC $\mu$ PD6345C.												
24	FUNC	O	Connect to the terminal CE of Analog switches LC7821N,LC7822N, and LC7823N. (Q309,Q310,Q692,Q308 and Q691)												
25	STB	O	Connect to the terminal STB of Electro volume TC9213P. (Q671)												
26	VOLUP	O	Volume UP/DOWN control output. (Q499) <table><tr><td>Operation</td><td>#27</td><td>#26</td></tr><tr><td>Stop</td><td>H</td><td>H</td></tr><tr><td>Volume up</td><td>L</td><td>H</td></tr><tr><td>Volume down</td><td>H</td><td>L</td></tr></table>	Operation	#27	#26	Stop	H	H	Volume up	L	H	Volume down	H	L
Operation	#27	#26													
Stop	H	H													
Volume up	L	H													
Volume down	H	L													
27	VOLDOWN	O													
28	SYSOUT	O	System code output terminal.												

## VIDEO SIGNAL CONTROL OUTPUT

Input Selector

#1	#3	SOURCE
L	L	VIDEO-3
H	L	VIDEO-2
L	H	
H	H	VIDEO-1

Recording Selector

#4	#2	SOURCE
L	L	VIDEO-3
H	L	VIDEO-2
L	H	
H	H	VIDEO-1
Same as #1	Same as #3	Other position
Same as #1	Same as #3	Multi mode



Pin No.	Function	I/O	Description
29	MR	O	MULTI ROOM indicator control output.
30	STBY/RECV	O	STAND-BY/RECEIVED indicator control output.
31	POWER	O	Power switch relay control output.
32	VSS		Ground terminal.
33	————	O	Not used.
34	————	O	Not used.
35	————	O	Not used.
36	————	O	Not used.
37	————	O	Not used.
38	————	O	Not used.
39	————	I	Not used.
40	STEREO	I	Stereo detection input terminal.
41	SD	I	Broadcast detection input terminal.
42	PROTECT	I	Protection circuit operation detection input terminal.
43	RESET	I	System reset input terminal.
44	REMIN	I	Remote control signal input terminal.
45	SYSIN	I	System code input terminal.
46	POFF	I	Detection input terminal for the stoppage of electric current.
47	————	I	Not used.
48	VDD		Power supply terminal.(+5V)
49	X2		Ceramic resonator connection terminal for the main system clock .
50	X1		Connect the ceramic resonator 8.38 MHz.
51	IC		Connect to the ground terminal.
52	XT2		Not used.
53	XT1		
54	AVSS		Ground terminal of A/D converter.
55	K0	I	Operation key connection terminals.
56	K1	I	
57	K2	I	
58	K3	I	
59	K4	I	
60	K5	I	
61	————		Not used.
62	MODE	I	Initializing input terminal for Receiver or Amplifier.
63	AVDD		Analogue power supply terminal of A/D converter. (+5V)
64	AVREF		Reference voltage input terminal of A/D converter.

### Initializing Input

#7,#6

BAND1	BAND0	Regin	Band	Frequency Range	Channel Space
0	0	U.S.A.	FM	87.50~108.00MHz	50kHz
			AM	530~1710kHz	10kHz
0	1	Europe	FM	87.50~108.00MHz	50kHz
			AM	530~1710kHz	9kHz
1	0	Worldwide	FM	87.50~108.00MHz	50kHz
			AM	530~1710kHz	9kHz
1	1	Japan	FM	87.50~108.00MHz	100kHz
			AM	530~1710kHz	9kHz

#62

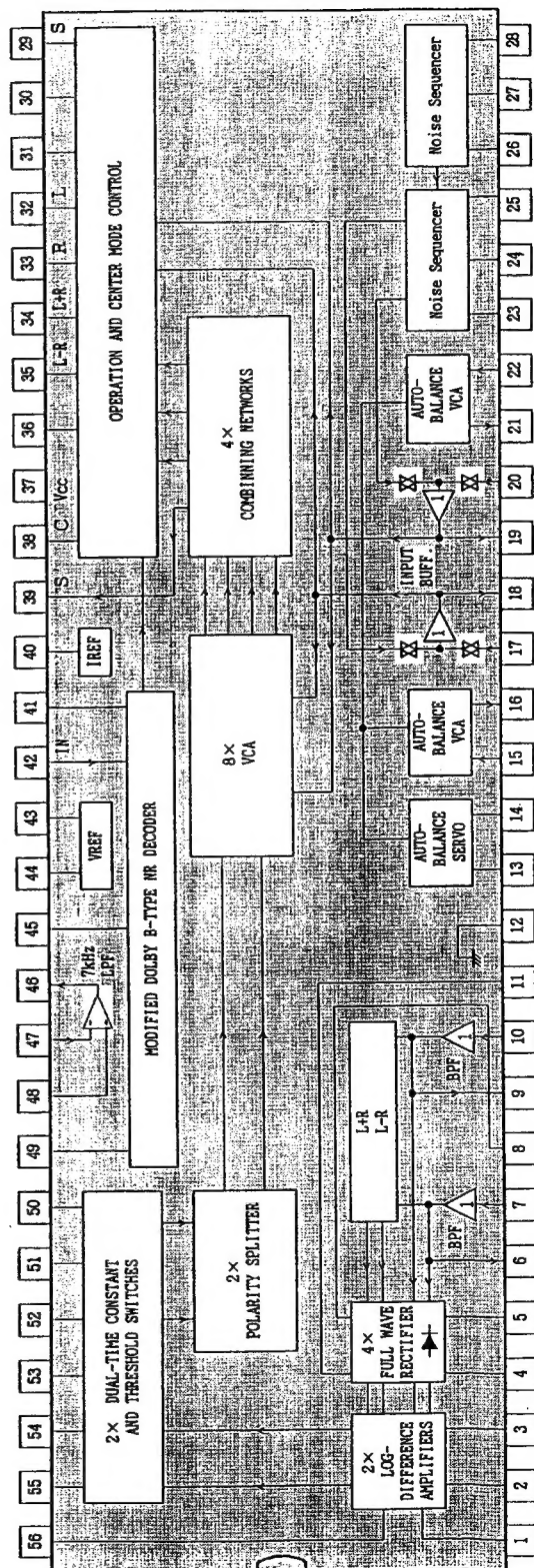
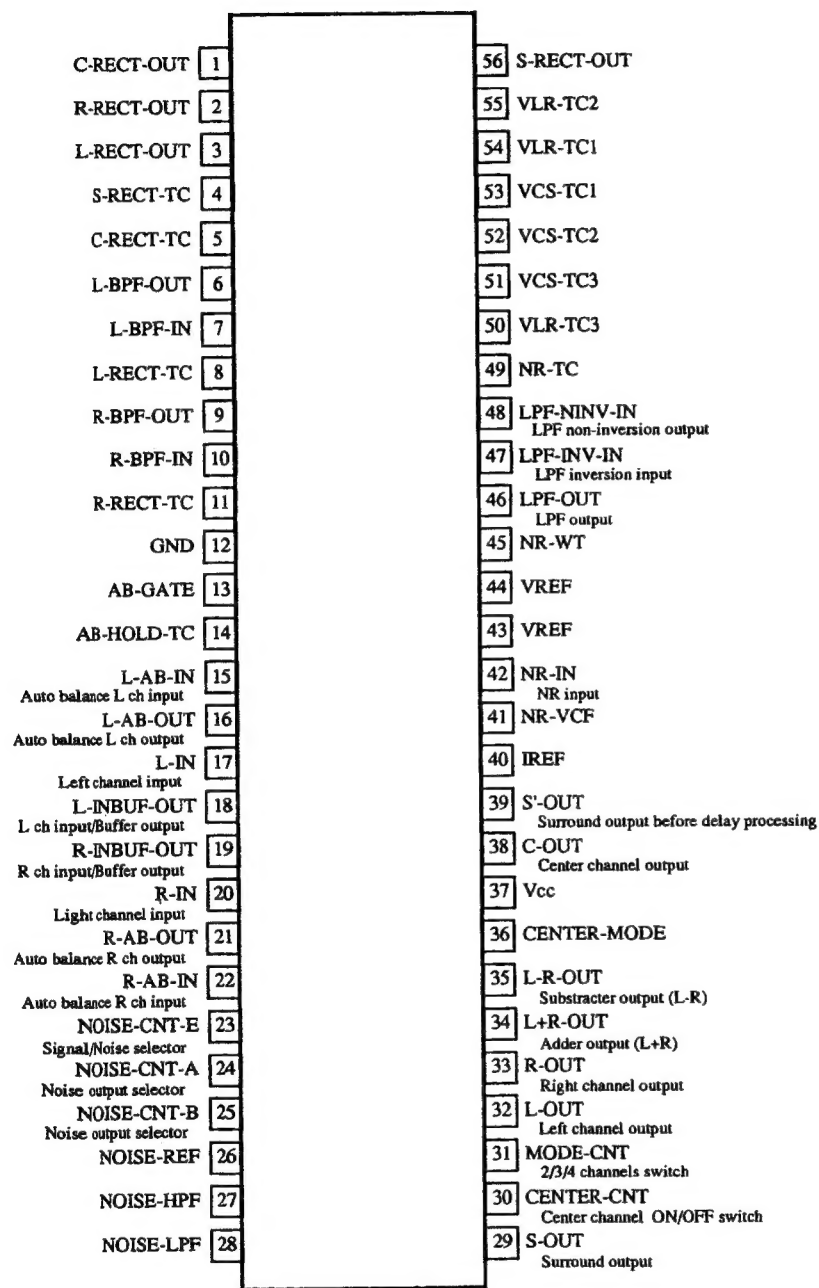
MODE	OPERATION
0	Receiver
1	Amplifier



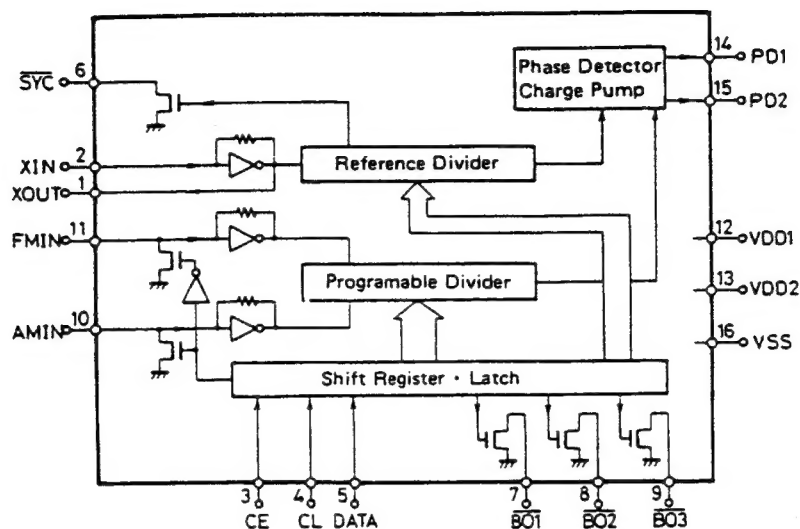
# IC BLOCK DIAGRAMS AND DESCRIPTIONS

## Q602

NJM2177L / M69032P (Dolby Pro Logic)

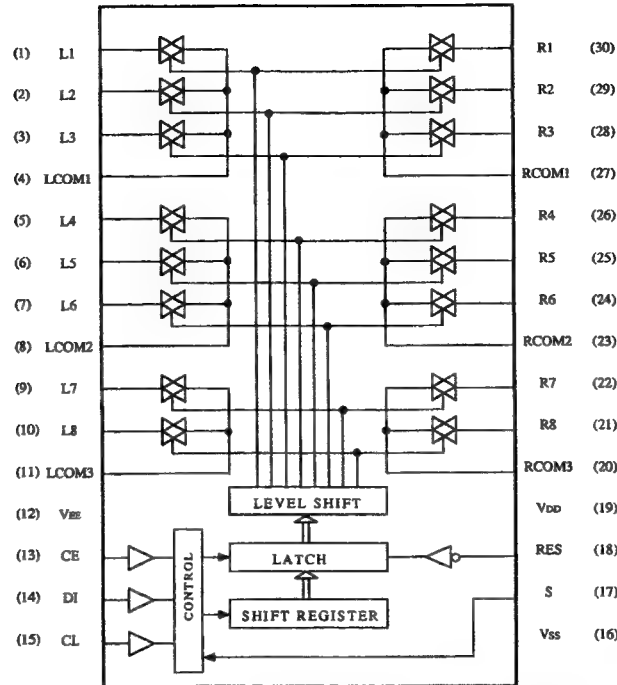


**Q107**  
**LM7001 (PLL Synthesizer and Controller)**



Pin No.	Terminal	Description
1	XOUT	Connect to the 7.2 MHz crystal oscillator.
2	XIN	
3	CE	Chip enable terminal. Connect to the PLL terminal of microprocessor.
4	CL	Serial clock input terminal. Connect to the CLOCK terminal of microprocessor.
5	DATA	Serial data input terminal. Connect to the DATA terminal of microprocessor.
6	SYN	Not used.
7	AUT/MONO	AUTO/MONO selection output terminal. "L" when AUTO.
8	FM	FM band control output terminal. "L" when FM.
9	AM	AM band control output terminal. "L" when AM.
10	AMIN	AM local oscillator input terminal.
11	FMIN	FM local oscillator terminal.
12	VDD 1	Power supply terminal for back-up.
13	VDD 2	Power supply terminal.
14	PD1	Charge pump output of the phase detector which constitutes the PLL. High level is output when the divided local oscillator frequency is high than the reference frequency. In the opposite case, low level is output. Floating occurs when the frequencies matched. The output is applied to the variable capacitor diode in the local oscillator through the low pass filters.
15	PD2	
16	Vss	Ground terminal.

### Q310, Q692 LC7822N (Analogue switch)



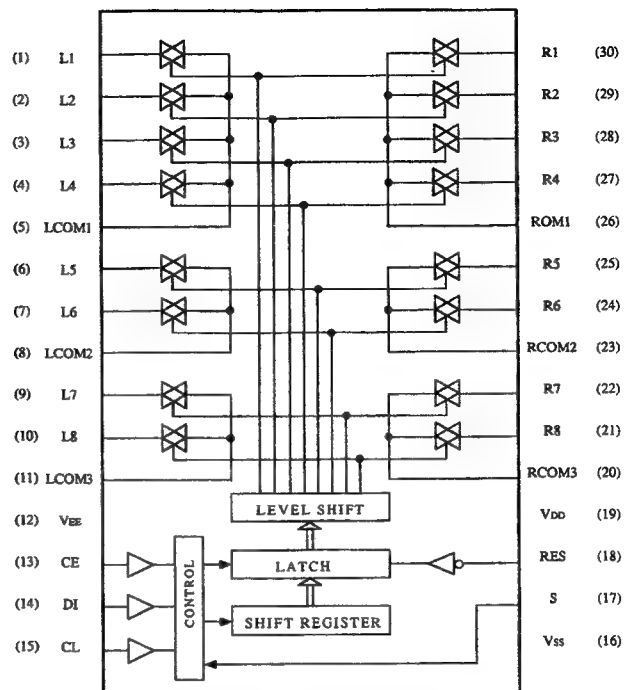
### Q310

Pin No.	Terminal	Description	Pin No.	Terminal	Description
1	VIDEO-3' REC	Input/output terminals of multi source of left channel. Control the analogue switch at the serial data.	16	VEE	Ground terminal
2	VIDEO-2' REC		17	S	Selector terminal
3	VIDEO-2' REC		18	RES	Reset terminal. When power is turned on, the condition of the analogue switch is not determined, but when this terminal is "L", all analogue switches are off.
4	LCOM1		19	VDD	Power supply terminal (+15V)
5	VIDEO-2 MON	Input/output terminals of audio signal of left channel. Control the analogue switch at the serial data.	20	RCOM3	Input/output terminals of VIDEO-3 signal of right channel.
6	VIDEO-2		21	VIDEO-3	Control the analogue switch at the serial data.
7	VIDEO-3 MON		22	VIDEO-3'	Control the analogue switch at the serial data.
8	LCOM2		23	RCOM2	Input/output terminals of audio signal of right channel.
9	VIDEO-3'	Input/output terminals of VIDEO-3 signal of left channel. Control the analogue switch at the serial data.	24	VIDEO-3 MON	Control the analogue switch at the serial data.
10	VIDEO-3		25	VIDEO-2	
11	LCOM3		26	VIDEO-2 MON	
12	Vss	Negative power supply terminal (-15V)	27	RCOM1	Input/output terminals of multi source of right channel. Control the analogue switch at the serial data.
13	CE	Chip enable terminal. Connect to the terminal FUNC of the microprocessor.	28	VIDEO-2' REC	
14	DI	Serial data input terminal. Connect to the terminal DATA of the microprocessor.	29	VIDEO-2'	
15	CL	Serial clock input terminal. Connect to the terminal CL of the microprocessor.	30	VIDEO-3' REC	

### Q692

Pin No.	Terminal	Description	Pin No.	Terminal	Description
1	SURROUND	Input/output terminals of audio source of left channel. Control the analogue switch at the serial data.	16	VEE	Ground terminal
2	NC		17	S	Selector terminal
3	MULTI		18	RES	Reset terminal. When power is turned on, the condition of the analogue switch is not determined, but when this terminal is "L", all analogue switches are off.
4	LCOM1		19	VDD	Power supply terminal (+15V)
5	MULTI		20	RCOM3	Input/output terminals of audio signal of right channel. Control the analogue switch at the serial data.
6	HALL		21	DOLBY	
7	DOLBY		22	DOLBY	
8	LCOM2		23	RCOM2	
9	DOLBY		24	DOLBY	
10	DOLBY		25	HALL	
11	LCOM3		26	MULTI	
12	Vss	Negative power supply terminal (-15V)	27	RCOM1	
13	CE	Chip enable terminal. Connect to the terminal FUNC of the microprocessor.	28	MULTI	
14	DI	Serial data input terminal. Connect to the terminal DATA of the microprocessor.	29	NC	
15	CL	Serial clock input terminal. Connect to the terminal CL of the microprocessor.	30	SURROUND	

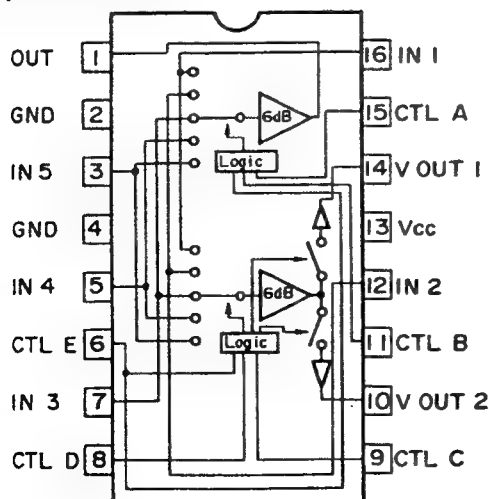
### Q309 LC7821N (Analogue switch)



### Q309

Pin No.	Terminal	Description	Pin No.	Terminal	Description
1	VIDEO-1'	Input/output terminals of multi source of left channel. Control the analogue switch at the serial data.	16	VEE	Ground terminal
2	TUNER'		17	S	Selector terminal
3	TAPE-1'		18	RES	Reset terminal. When power is turned on, the condition of the analogue switch is not determined, but when this terminal is "L", all analogue switches are off.
4	TAPE-1' REC		19	VDD	Power supply terminal (+15V)
5	LCOM1		20	RCOM3	Input/output terminals of audio signal of right channel. Control the analogue switch at the serial data.
6	TAPE-1 MON	Input/output terminals of TAPE-1 signal of left channel. Control the analogue switch at the serial data.	21	VIDEO-1	Input/output terminals of TAPE-1 signal of right channel. Control the analogue switch at the serial data.
7	TAPE-1		22	TUNER	
8	LCOM2	Input/output terminals of audio signal of left channel. Control the analogue switch at the serial data.	23	RCOM2	Input/output terminals of TAPE-1 signal of right channel. Control the analogue switch at the serial data.
9	TUNER		24	TAPE-1	
10	VIDEO-1	Input/output terminals of audio signal of left channel. Control the analogue switch at the serial data.	25	TAPE-1 MON	Input/output terminals of multi source of right channel. Control the analogue switch at the serial data.
11	LCOM3		26	RCOM1	
12	Vss	Negative power supply terminal (-15V)	27	TAPE-1' REC	Input/output terminals of multi source of right channel. Control the analogue switch at the serial data.
13	CE	Chip enable terminal. Connect to the terminal FUNC of the microprocessor.	28	TAPE-1'	
14	DI	Serial data input terminal. Connect to the terminal DATA of the microprocessor.	29	TUNER'	
15	CL	Serial clock input terminal. Connect to the terminal CL of the microprocessor.	30	VIDEO-1'	

### Q251 BA7625 (Video Selector Switch)



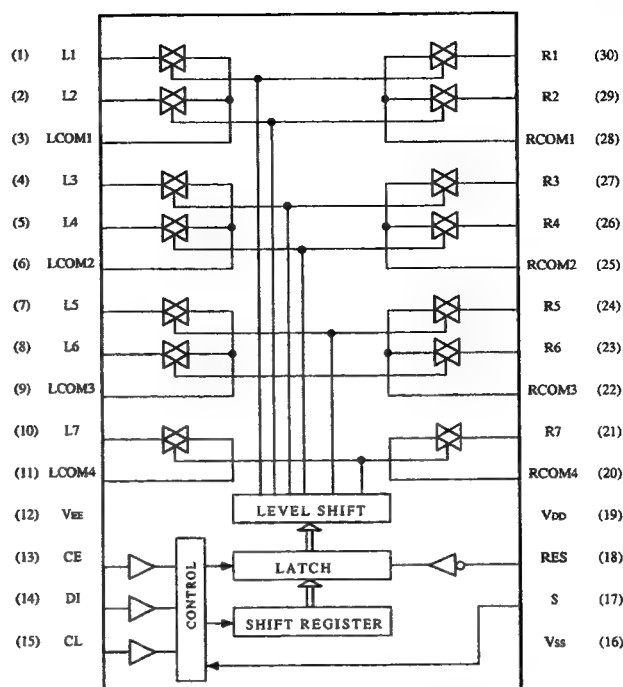
#15	#11	#6	#1
A	B	E	MONITOR OUT
L	L	X	IN1
H	L	X	IN2
L	H	X	IN3
H	H	L	IN4
H	H	H	IN5

X: Don't care

#9	#8	#6	#14
C	D	E	VOUT 1
L	L	X	
H	L	X	IN2
L	H	X	IN3
H	H	L	IN4
H	H	H	IN5

#15	#11	#6	#10
A	B	E	VOUT 2
L	L	X	IN1
H	L	X	
L	H	X	IN3
H	H	L	IN4
H	H	H	IN5

# **Q308, Q691** **LC7823N (Analogue switch)**



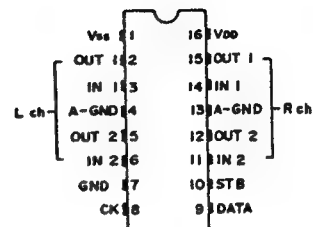
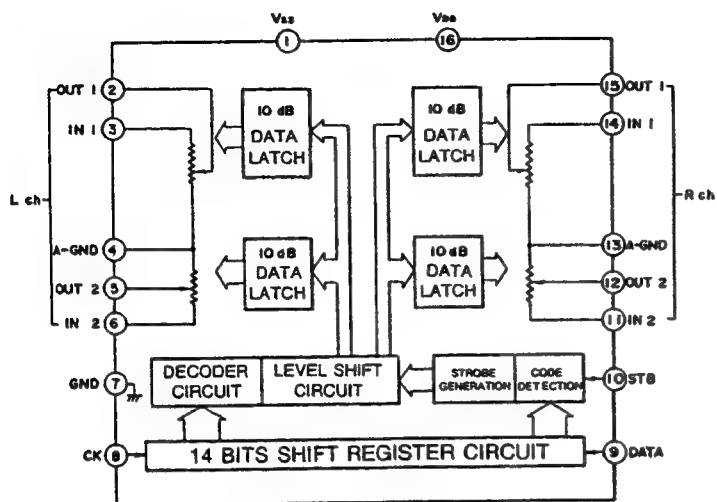
## **Q308**

Pin No.	Terminal	Description	Pin No.	Terminal	Description
1	PHONO'	Input/output terminals of multi source of left channel.	16	VEE	Ground terminal
2	CD'	Control the analogue switch at the serial data.	17	S	Selector terminal
3	LCOM1		18	RES	Reset terminal. When power is turned on, the condition of the analogue switch is not determined, but when this terminal is "L", all analogue switches are off.
4	CD	Input/output terminals of audio signal of left channel.	19	VDD	Power supply terminal (+15V)
5	PHONO	Control the analogue switch at the serial data.	20	RCOM4	Input/output terminals of multi source of right channel.
6	LCOM2		21	TAPE-2'	Control the analogue switch at the serial data.
7	SOURCE		22	RCOM3	Input/output terminals of audio signal of right channel.
8	TAPE-2		23	TAPE-2	Control the analogue switch at the serial data.
9	LCOM3		24	SOURCE	
10	TAPE-2'	Input/output terminals of multi source of left channel.	25	RCOM2	
11	LCOM4	Control the analogue switch at the serial data.	26	PHONO	
12	Vss	Negative power supply terminal (-15V)	27	CD	
13	CE	Chip enable terminal. Connect to the terminal FUNC of the microprocessor.	28	RCOM1	Input/output terminals of multi source of right channel.
14	DI	Serial data input terminal. Connect to the terminal DATA of the microprocessor.	29	CD'	Control the analogue switch at the serial data.
15	CL	Serial clock input terminal. Connect to the terminal CL of the microprocessor.	30	PHONO'	

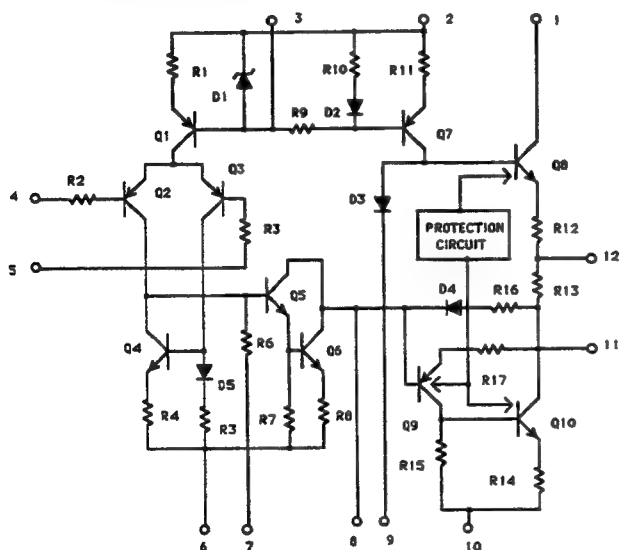
## **Q691**

Pin No.	Terminal	Description	Pin No.	Terminal	Description
1	DOLBY	Input/output terminals of digital delay signal when surround mode.	16	VEE	Ground terminal
2	HALL	Control the analogue switch at the serial data.	17	S	Selector terminal
3	LCOM1		18	RES	Reset terminal. When power is turned on, the condition of the analogue switch is not determined, but when this terminal is "L", all analogue switches are off.
4	NORMAL	Mode select terminal when Dolby Pro Logic.	19	VDD	Power supply terminal (+15V)
5	WIDE	Control the analogue switch at the serial data.	20	NC	Not used.
6	LCOM2		21	NC	
7	TEST B		22	NC	
8	TEST A		23	NC	
9	LCOM3		24	NC	
10	TEST		25	NC	
11	LCOM4		26	NC	
12	Vss	Negative power supply terminal (-15V)	27	NC	
13	CE	Chip enable terminal. Connect to the terminal FUNC of the microprocessor.	28	NC	
14	DI	Serial data input terminal. Connect to the terminal DATA of the microprocessor.	29	NC	
15	CL	Serial clock input terminal. Connect to the terminal CL of the microprocessor.	30	NC	

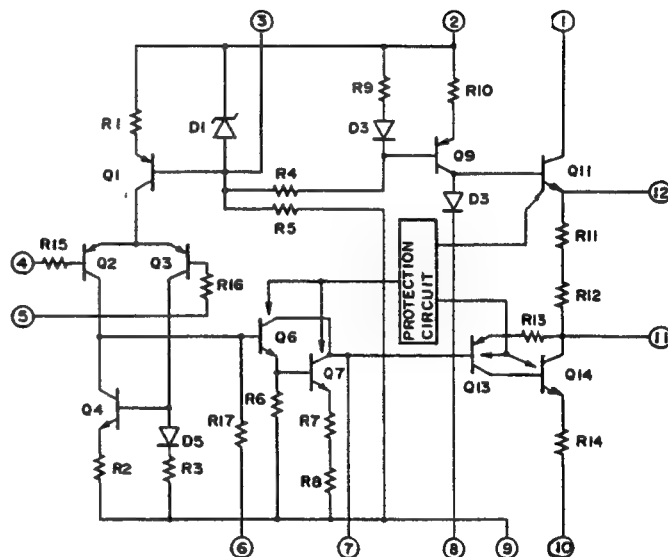
### Q451 TC9213P (Electro Volume)



### Q501, Q502, Q541 $\mu$ PC1298V (Power Amplifier Driver)

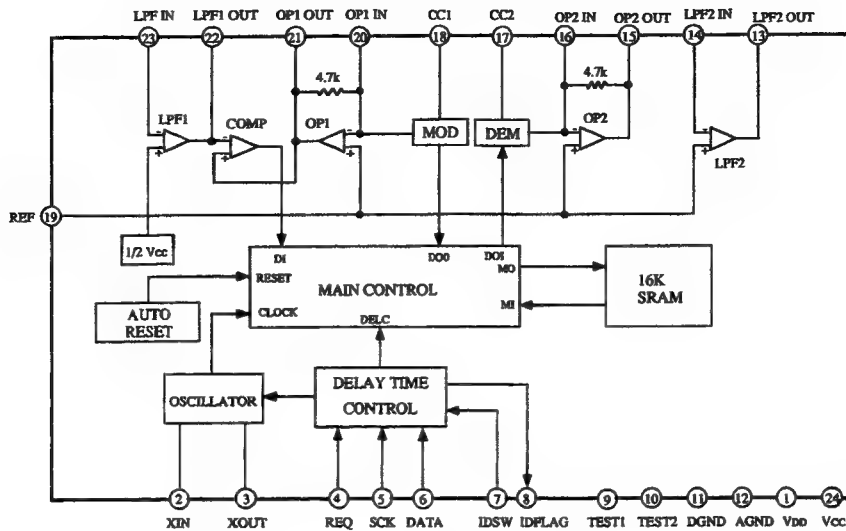


### Q571, Q572 $\mu$ PC1225H



# Q661

## M65830P (Digital Delay)

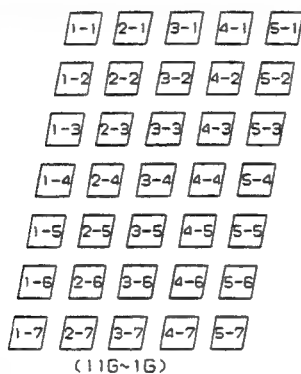
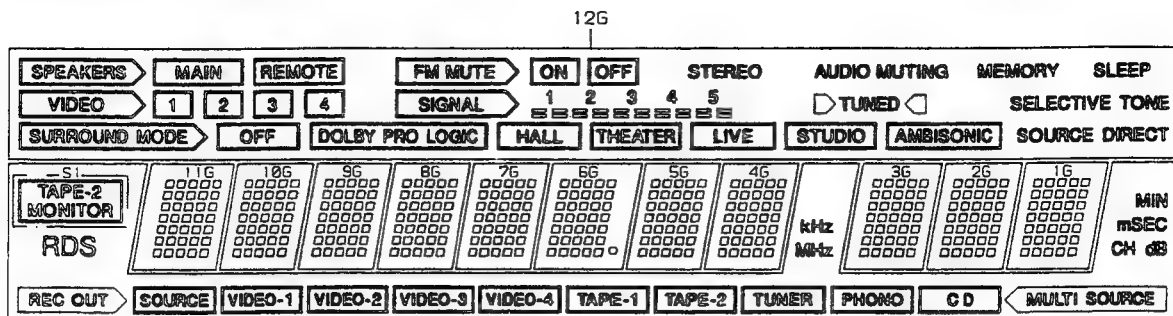


Pin No.	Mark	Function	I/O	Description
1	VDD	Digital power supply	-	
2	XIN	Resonator input	I	Connect the 2MHz ceramic resonator
3	XOUT	Resonator output	O	
4	REQ	Request	I	Data request input
5	SCK	Shift lock	I	Serial data shift clock input
6	DATA	Data	I	Serial data input
7	IDSW	ID switch	I	External input of 4th bit of ID code
8	IDFLAG	ID flag	O	Data input confirmation pulse and serial data output
9	TEST1	Test 1	-	Normal mode when low level
10	TEST2	Test 2	-	Normal mode when low level
11	D GND	Digital ground	-	
12	A GND	Analog ground	-	
13	LPF2 OUT	LPF filter 2 output	O	
14	LPF2 IN	LPF filter 2 input	I	
15	OP2 OUT	Operation amp. 2 output	O	
16	OP2 IN	Operation amp. 2 input	I	
17	CC2	Current control 2	-	Demodulation ADM control
18	CC1	Current control 1	-	Modulation ADM control
19	REF	Reference	-	Analog reference voltage=1/2VCC
20	OP1 IN	Operation amp. 1 input	I	
21	OP1 OUT	Operation amp. 1 output	O	
22	LPF1 OUT	LPF filter 1 output	O	
23	LPF1 IN	LPF filter 1 input	I	
24	VCC	Analog power supply	-	



## Q703

13-BT-131GK (Fluorescent Indicator Tube)

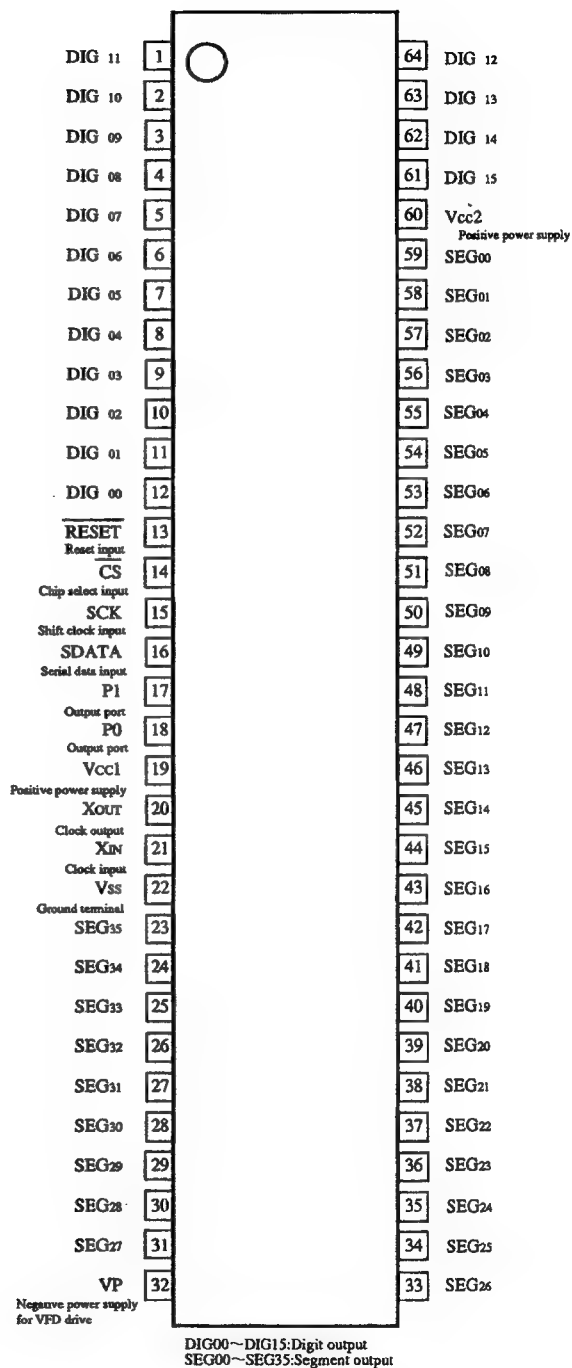
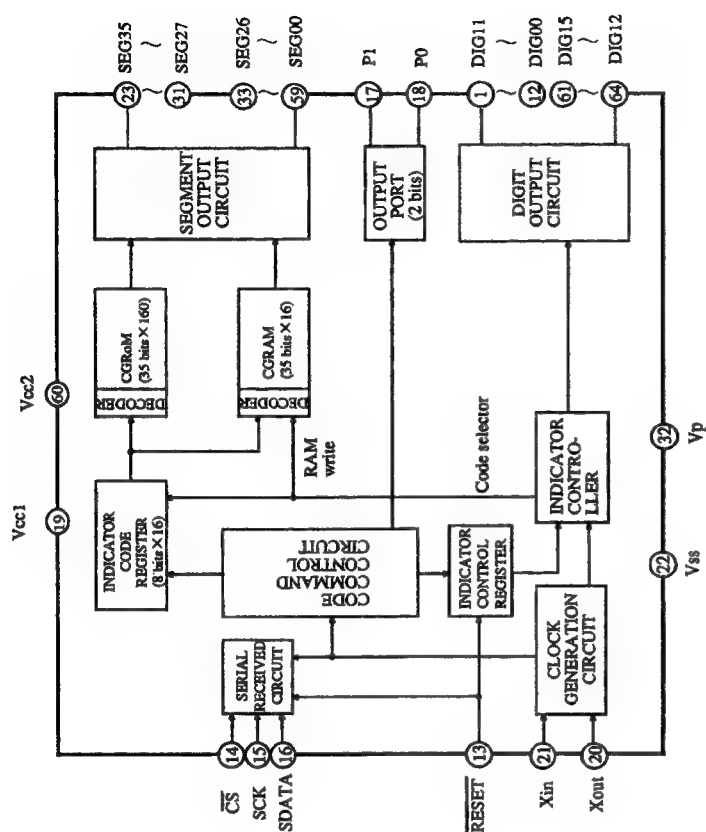


	13G	12G	11G~7G	6G	5G~1G
P1	MIN	SLEEP	1-1	1-1	1-1
P2	mSEC	MEMORY	2-1	2-1	2-1
P3	dB	AUDIO MUTING	3-1	3-1	3-1
P4	CH	SELECTIVE TONE	4-1	4-1	4-1
P5	MULTI SOURCE	SOURCE DIRECT	5-1	5-1	5-1
P6	REC OUT	TUNED	1-2	1-2	1-2
P7	SOURCE	□ TUNED □	2-2	2-2	2-2
P8	(SOURCE)	STEREO	3-2	3-2	3-2
P9	VIDEO-1	OFF (Center)	4-2	4-2	4-2
P10	(VIDEO-1)	ON	5-2	5-2	5-2
P11	VIDEO-2	FM MUTE	1-3	1-3	1-3
P12	(VIDEO-2)	AMBISONIC	2-3	2-3	2-3
P13	VIDEO-3	STUDIO	3-3	3-3	3-3
P14	(VIDEO-3)	LIVE	4-3	4-3	4-3
P15	VIDEO-4	THEATER	5-3	5-3	5-3
P16	(VIDEO-4)	HALL	1-4	1-4	1-4
P17	TAPE-1	DOLBY PRO LOGIC	2-4	2-4	2-4
P18	(TAPE-1)	OFF (LEFT)	3-4	3-4	3-4
P19	TAPE-2	SURROUND MODE	4-4	4-4	4-4
P20	(TAPE-2)	1 2 3 4 5	5-4	5-4	5-4
P21	TUNER	B5	1-5	1-5	1-5
P22	(TUNER)	B4	2-5	2-5	2-5
P23	PHONO	B3	3-5	3-5	3-5
P24	(PHONO)	B2	4-5	4-5	4-5
P25	CD	B1	5-5	5-5	5-5
P26	(CD)	SIGNAL	1-6	1-6	1-6
P27	kHz	REMOTE	2-6	2-6	2-6
P28	MHz	MAIN	3-6	3-6	3-6
P29	SI	SPEAKERS	4-6	4-6	4-6
P30	RDS	4	5-6	5-6	5-6
P31		3	1-7	1-7	1-7
P32		2	2-7	2-7	2-7
P33		1	3-7	3-7	3-7
P34		VIDEO	4-7	4-7	4-7
P35			5-7	5-7	5-7
P36				○	

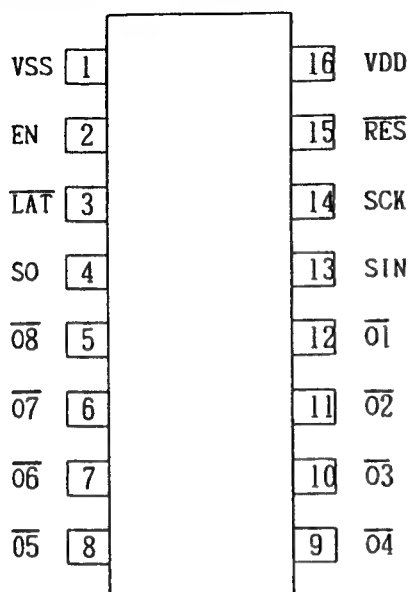
PIN NO.	64	63	62	61	60	59	58	57
CONNECTION	F2	F2	NP	NP	P36	P35	P34	P33
PIN NO.	56	55	54	53	52	51	50	49
CONNECTION	P32	P31	P30	P29	P28	P27	P26	P25
PIN NO.	48	47	46	45	44	43	42	41
CONNECTION	P24	P23	P22	P21	P20	P19	P18	P17
PIN NO.	40	39	38	37	36	35	34	33
CONNECTION	P16	P15	P14	P13	P12	P11	P10	P9
PIN NO.	32	31	30	29	28	27	26	25
CONNECTION	P8	P7	P6	P5	P4	P3	P2	P1
PIN NO.	24	23	22	21	20	19	18	17
CONNECTION	NC	NC	NC	NC	NC	NC	NC	13G
PIN NO.	16	15	14	13	12	11	10	9
CONNECTION	12G	11G	10G	9G	8G	7G	6G	5G
PIN NO.	8	7	6	5	4	3	2	1
CONNECTION	4G	3G	2G	1G	NP	NP	F1	F1

## Q702

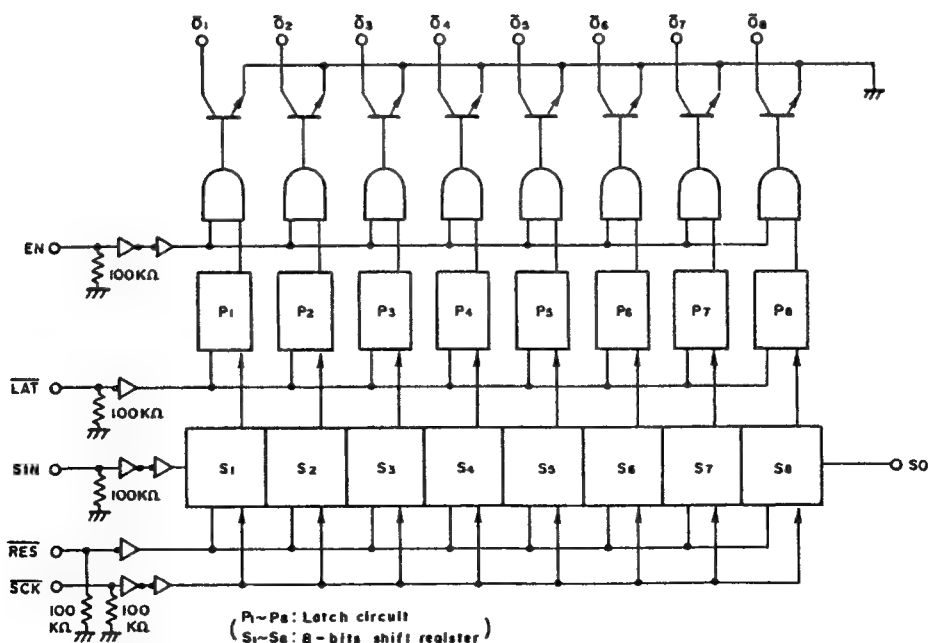
μM6604FP (FL tube Driver)



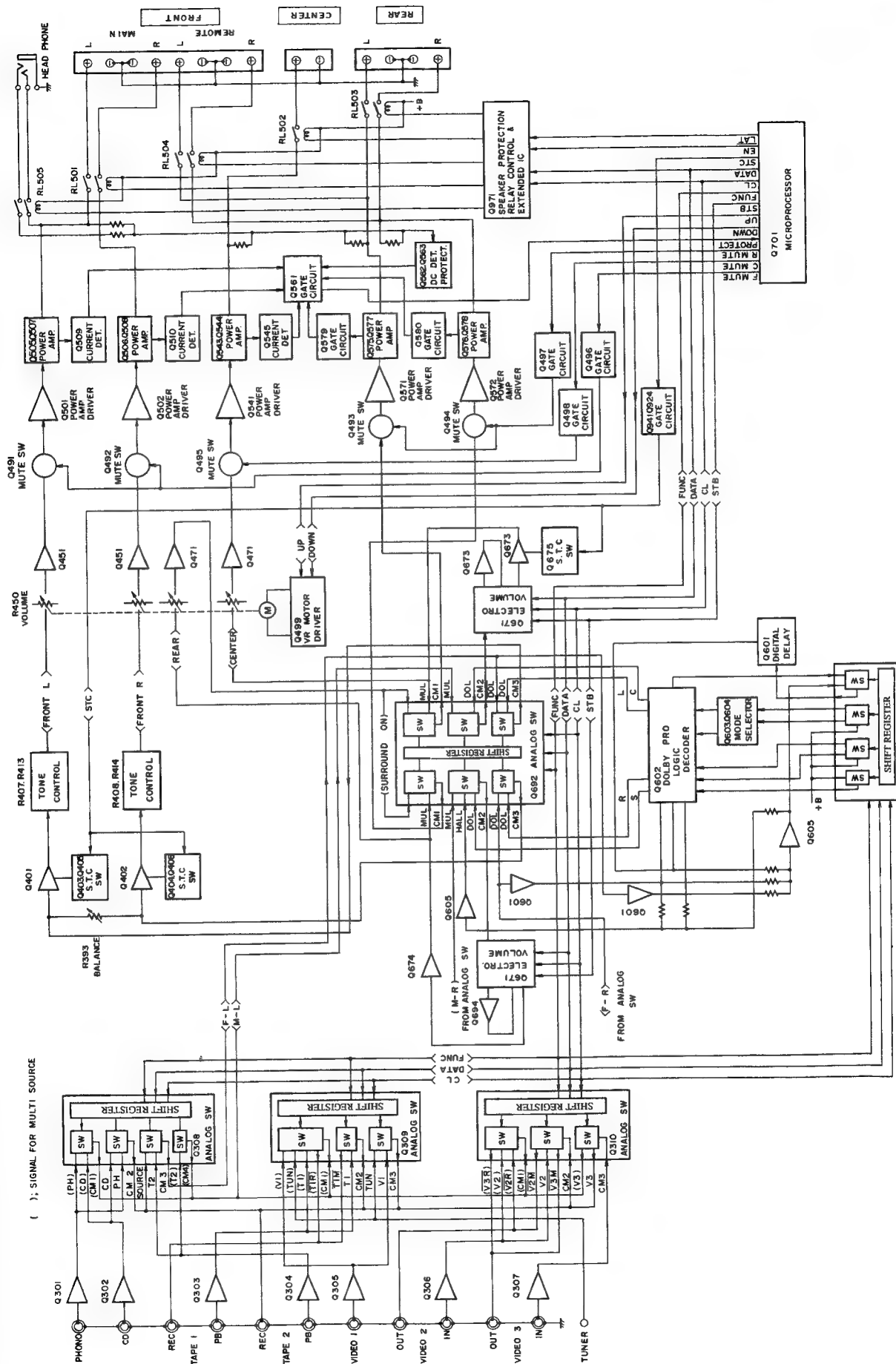
## Q971

 $\mu$ PD6345C (Extended IC)

Pin No.	Symbol	Description
1	VSS	Ground terminal
2	EN	Chip enable input terminal. Connect to the terminal EN of the microprocessor.
3	$\overline{\text{LAT}}$	Latch input terminal. Connect to the terminal LAT of the microprocessor.
4	SO	Serial data output terminal. Not used.
5	$\overline{\text{O8}}$	Not used.
6	$\overline{\text{O7}}$	Not used.
7	$\overline{\text{O6}}$	Front speaker relay control output terminal
8	$\overline{\text{O5}}$	Center speaker relay control output terminal
9	$\overline{\text{O4}}$	Rear speaker relay control terminal
10	$\overline{\text{O3}}$	Remote speaker relay control terminal
11	$\overline{\text{O2}}$	Headphone relay control output terminal
12	$\overline{\text{O1}}$	Power supply voltage switch relay control output terminal
13	SIN	Serial data input terminal. Connect to the terminal DATA of the microprocessor.
14	SCK	Serial clock input terminal. Connect to the terminal CLOCK of the microprocessor.
15	$\overline{\text{RESET}}$	Reset input terminal
16	VDD	Power supply terminal

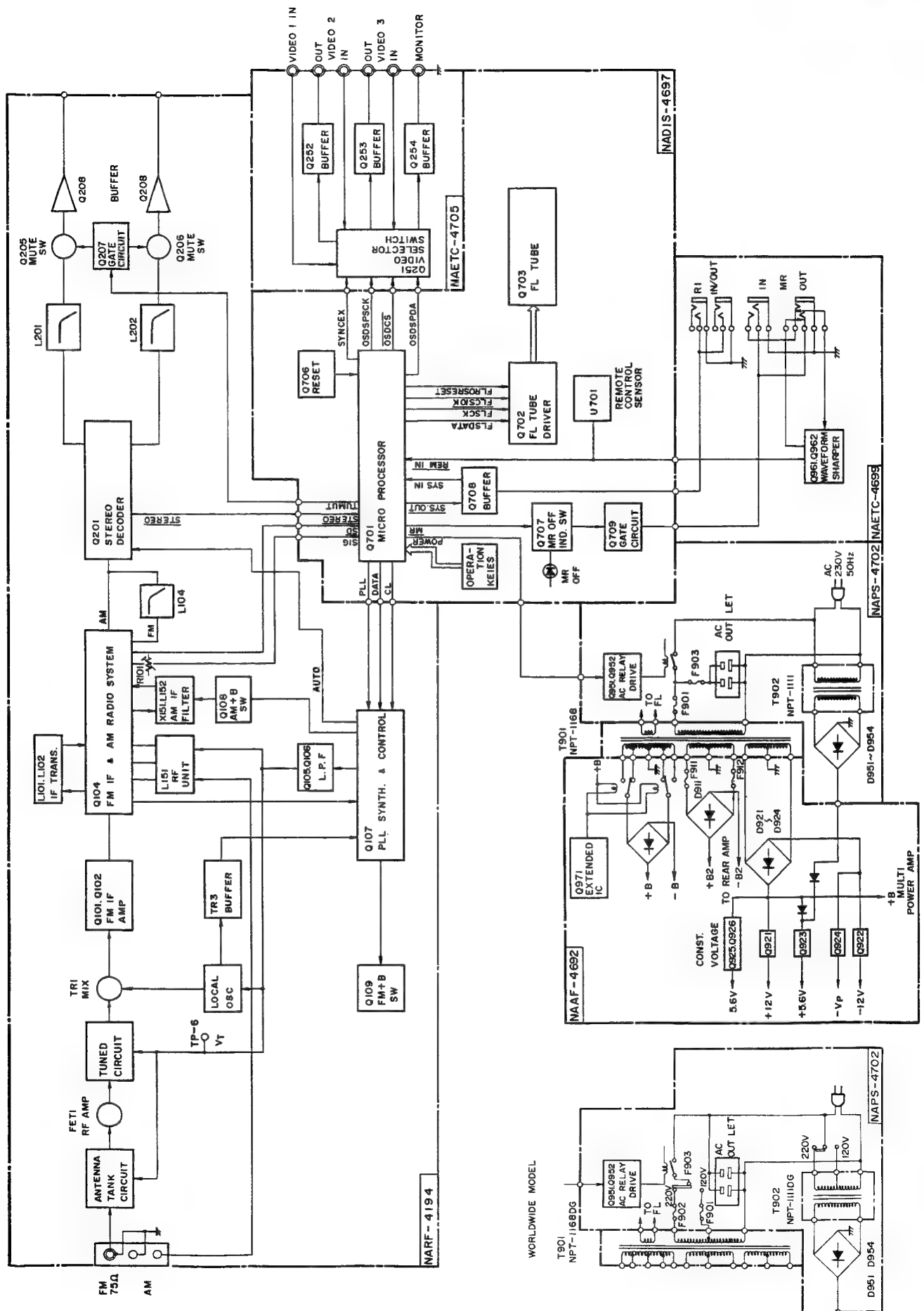


## BLOCK DIAGRAM AMPLIFIER SECTION





(Other models)



## ADJUSTMENT PROCEDURES

### • Preparation

#### 1. Input

FM mono : 1 kHz, 75kHz devi., 60dB/ $\mu$ V

FM stereo : 1 kHz, 75kHz devi., 60dB/ $\mu$ V

Pilot signal 19kHz 7.5kHz devi.

AM : 400Hz 30% mod.

#### 2. Outputs

Connect the non-inductive type resistors of 8ohms to the main speaker, remote speaker, and rear speaker terminals unless otherwise noted.

#### 3. Initializing of unit

1. Press and hold down the CD button, then press the POWER button.

2. "Test-" is displayed on the display for approximately 5 seconds.

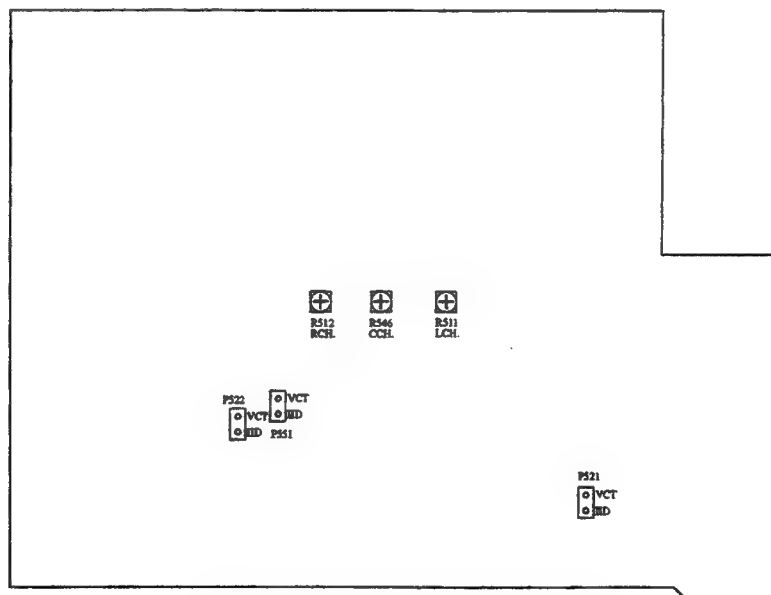
3. While "Test-" is displayed, unplug the TX-SV515PRO's power cord from its AC outlet, then "Test-" will disappear.

4. Preset memory and parameters stored in memory, such as surround are initialized and will return to the factory settings.

#### 4. Standard Knob Position

TAPE MONITOR 2 .....OFF  
 VOLUME.....Maximum  
 BASS/TREBLE/BALANCE.....Center  
 MUTING.....OFF  
 REC SELECTOR.....SOURCE  
 INPUT SELECTOR.....CD  
 SPEAKERS .....ON  
 S.T.C.....OFF

SURROUND MODE.....OFF  
 CENTER MODE.....WIDE  
 DELAY TIME.....20mS  
 MULTI/REAR LEVEL .....Center  
 MR OFF.....ON



MAIN CIRCUIT PC BOARD

### Amplifier section

#### Idling Current Adjustment

Connect the DC voltmeter to the terminals P521, P522, and P551 (VCT and IID) on the main circuit pc board.

Adjust the trim resistors R511, R512 and R546 so that the indicator of voltmeter becomes  $5 \pm 0.5$ mV.

NOTE: Adjust after switching on for 5 minutes.



## FM section

Item	Step	Connection of instrument	FM SG output	Stereo modulator output	Tuning frequency	Output indicator	Adjustment point	Adjust for	Remarks
FM IF/RF	1	Fig.1	99.1MHz 1kHz 75kHz devi. 65dBf(60dB)	—	99.1MHz	DC voltmeter	L101	$0 \pm 20\text{mV}$	FM MUTE/MODE switch:ON/STEREO Repeat the steps 1 and 3 until no further adjustment is necessary.
	2					AC voltmeter	IFT on the front end	Maximum	
	3					Distortion analyzer	L102	Minimum	
VCO		Fig.2	99.1MHz 1kHz 75kHz devi. 65dBf(60dB)	—	99.1MHz	Frequency counter	R201	$19\text{kHz} \pm 10\text{Hz}$	
Stereo Distortion		Fig.3	99.1MHz Ext. mod.65dBf(60dB)	Channel L or R 1kHz	99.1MHz	Distortion analyzer	IFT on the front end	Minimum	Don't turn more than $\pm 180^\circ$
Stereo Separation	1	Fig.3	99.1MHz Ext. mod. 65dBf(60dB)	Channel L 1kHz	99.1MHz	Channel R AC voltmeter	R202	Minimum	Maximum and same separation
	2			Channel R 1kHz		Channel L AC voltmeter		Minimum	
Muting Level		Fig.3	99.1MHz 17.2dBf(12dB) <19.2dBf(14dB)>	—	99.1MHz	Oscilloscope	R101	Signal output	

NOTE:&lt; &gt;:230V and Worldwide models

## AM section

## 120V model

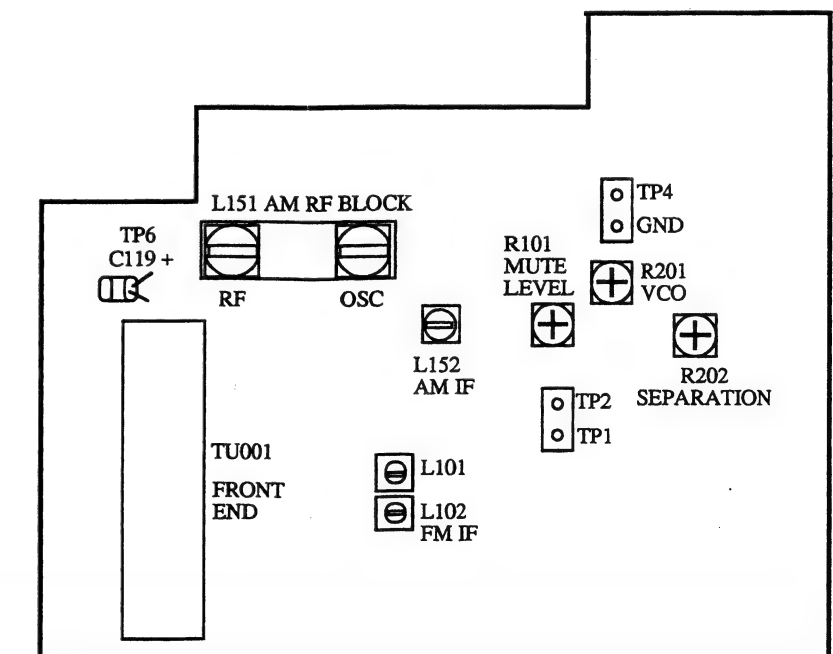
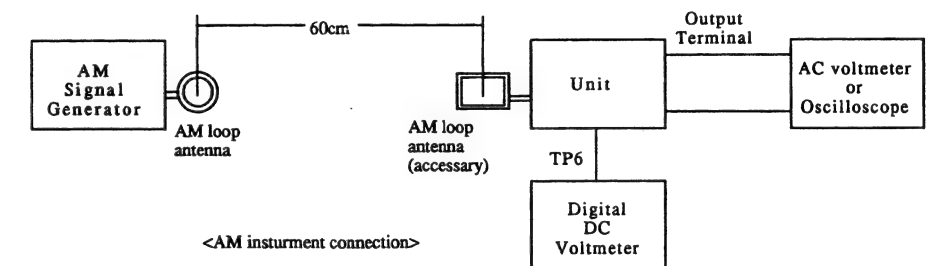
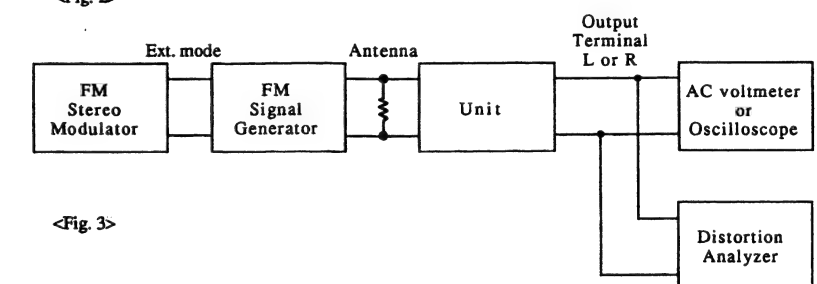
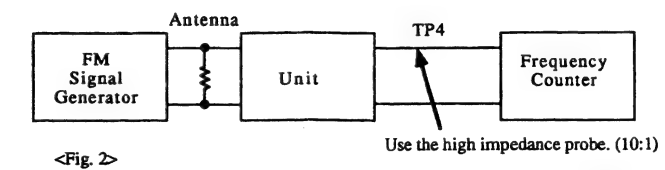
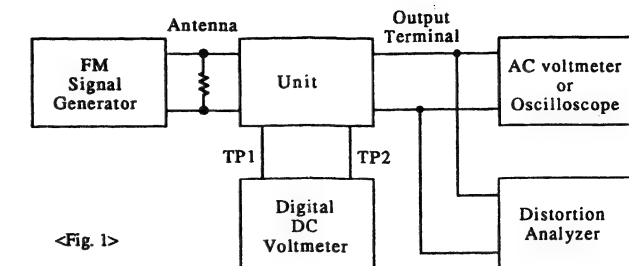
Step	AM SG output	Tuning Frequency	Output Indicator	Adjustment point	Adjust for
1		530kHz	Digital DC voltmeter	OSC coil on RF block L151	$1.4 \pm 0.2\text{V}$
2	600kHz 400Hz 30% mod. 60dB/m	600kHz	AC voltmeter	RF coil on RF block L151	Maximum
3	990kHz 400Hz 30% mod. 60dB/m	990kHz	AC voltmeter	L152	Maximum

Reference Specification  
 FM tuned voltage:87.9MHz-107.9MHz  
 More than 1.3V-Less than 10V  
 AM tuned voltage:530kHz-1710kHz  
 $1.4 \pm 0.2\text{V}$ -Less than 9.0V

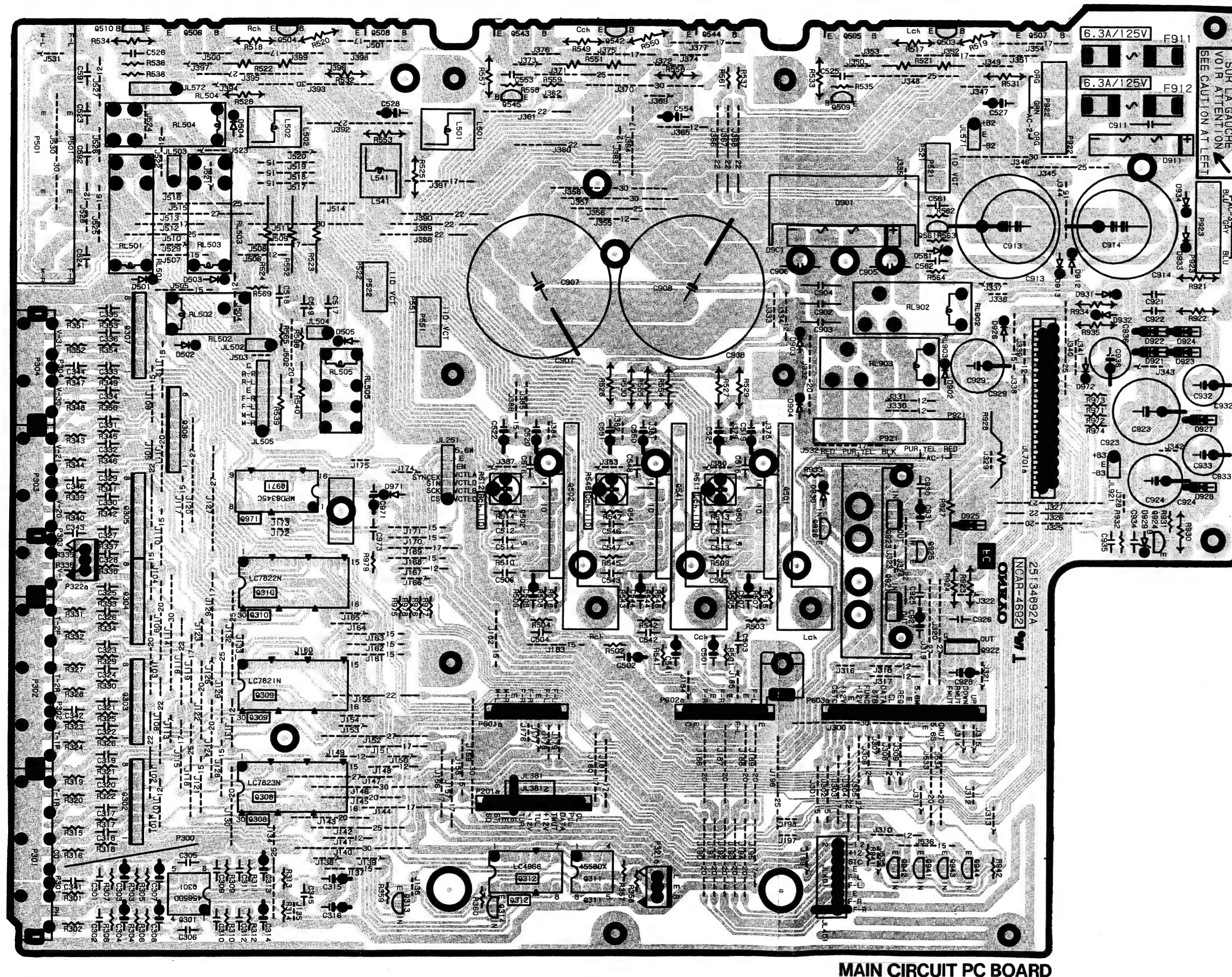
## 230V and Worldwide models

Step	AM SG output	Tuning Frequency	Output Indicator	Adjustment point	Adjust for
1		522kHz or 531kHz	Digital DC voltmeter	OSC coil on RF block L151	$1.3 \pm 0.2\text{V}$
2	603kHz 400Hz 30% mod. 60dB/m	603kHz	AC voltmeter	RF coil on RF block L151	Maximum
3	999kHz 400Hz 30% mod. 60dB/m	999kHz	AC voltmeter	L152	Maximum

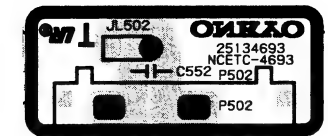
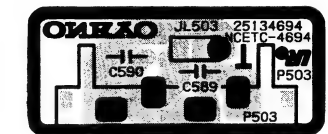
Reference Specification  
 FM tuned voltage:87.5MHz-108MHz  
 More than 1.3V-Less than 10V  
 AM tuned voltage:522kHz-1611kHz  
 $1.3 \pm 0.2\text{V}$ -Less than 9.0V (230V model)  
 AM tuned voltage:531kHz-1602kHz  
 $1.3 \pm 0.2\text{V}$ -Less than 9.0V (Worldwide model)



## PRINTED CIRCUIT BOARD VIEW FROM BOTTOM SIDE



MAIN CIRCUIT PC BOARD

CENTER SPEAKER TERMINAL  
PC BOARD

SPEAKER TERMINAL PC BOARD

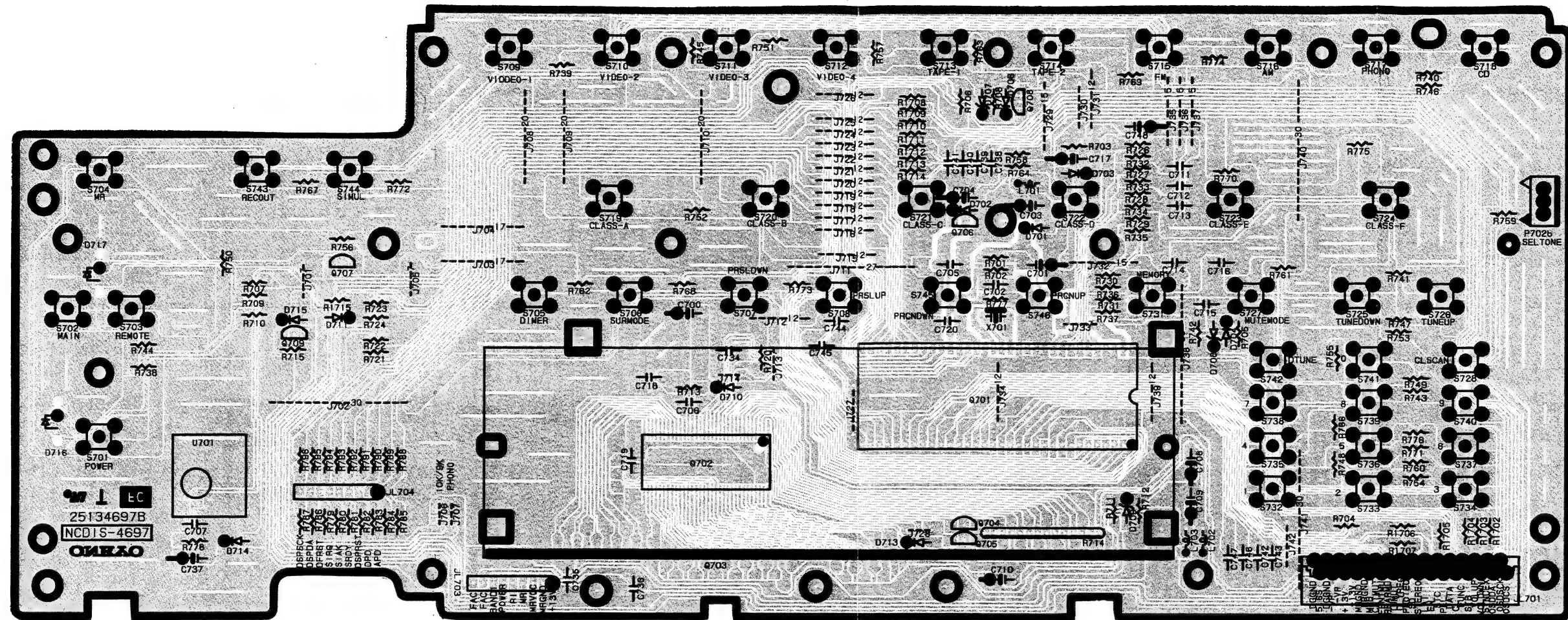


HEADPHONE TERMINAL PC BOARD

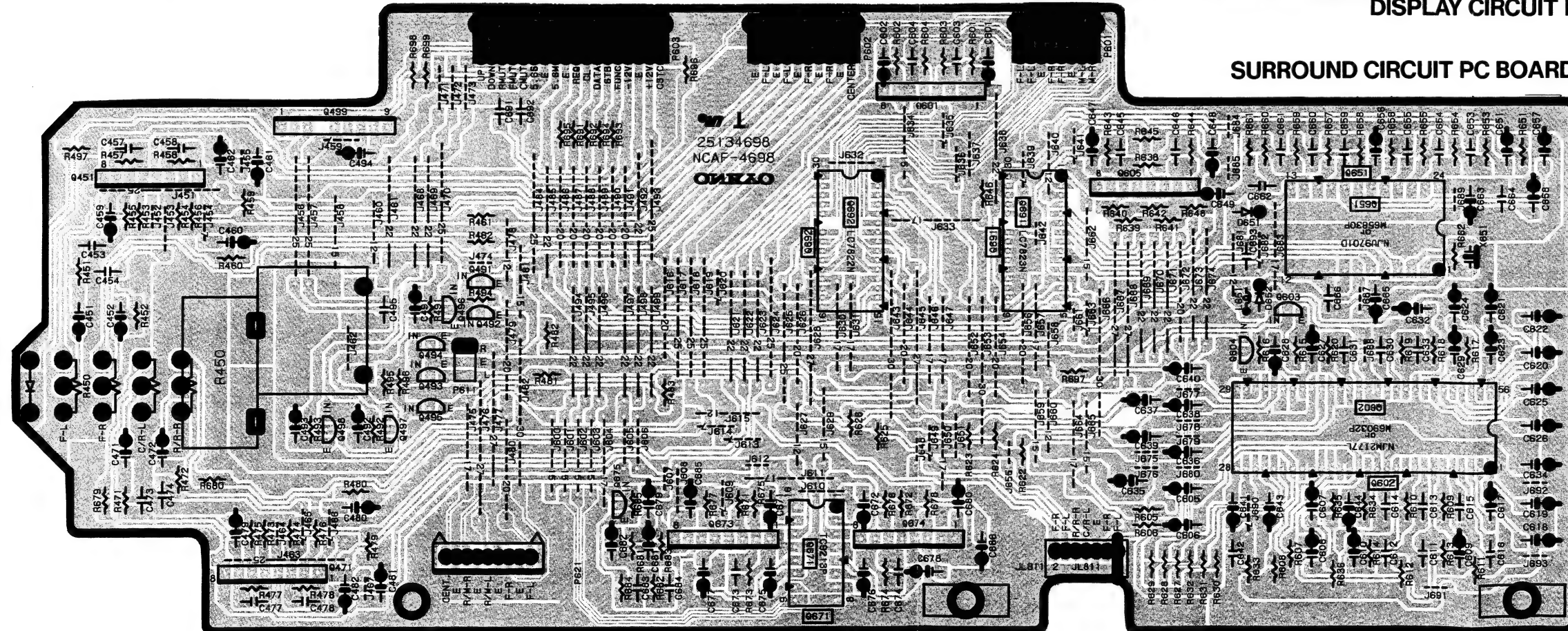


STC SWITCH PC BOARD

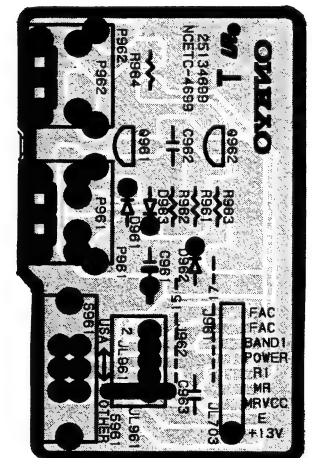




DISPLAY CIRCUIT PC BOARD



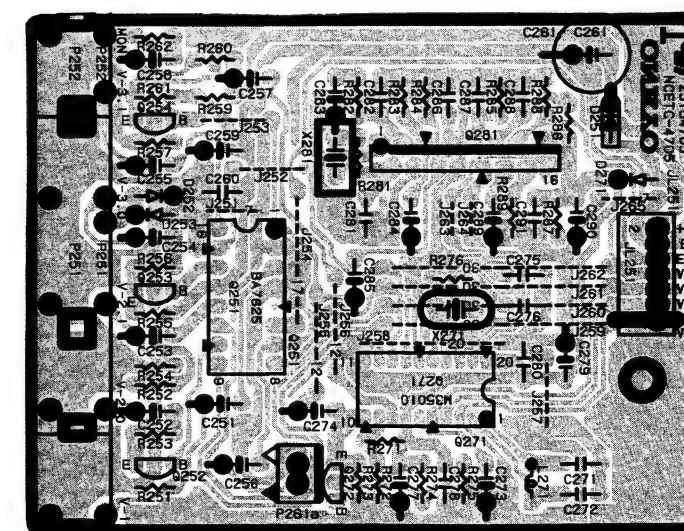
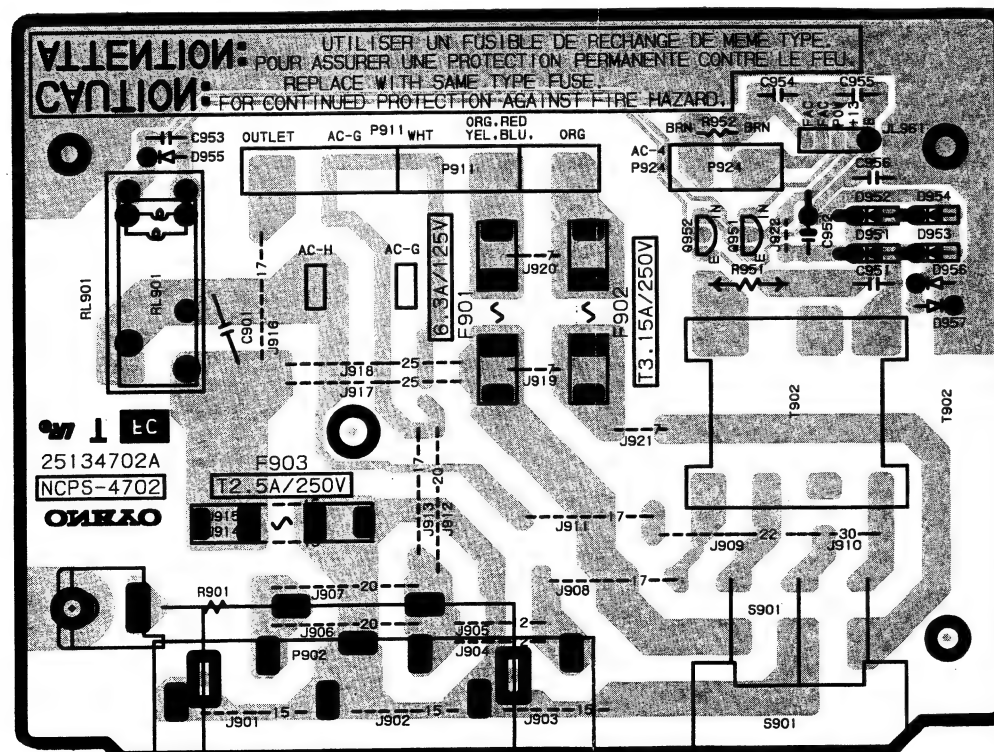
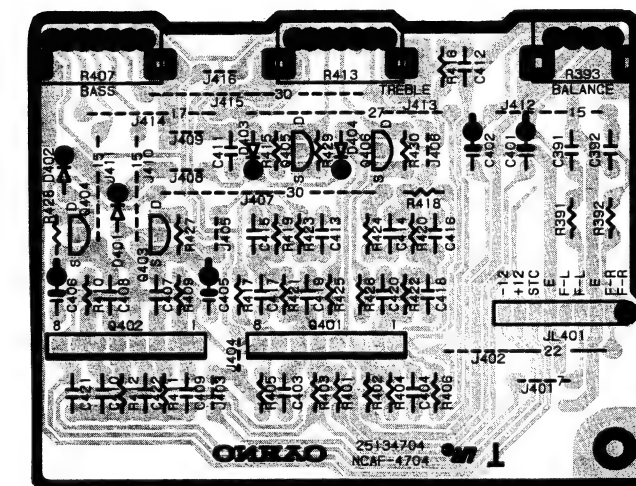
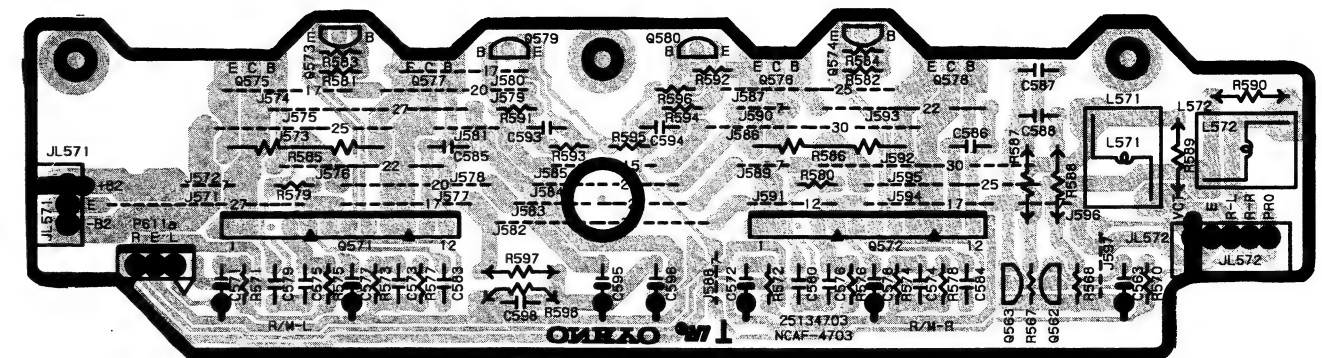
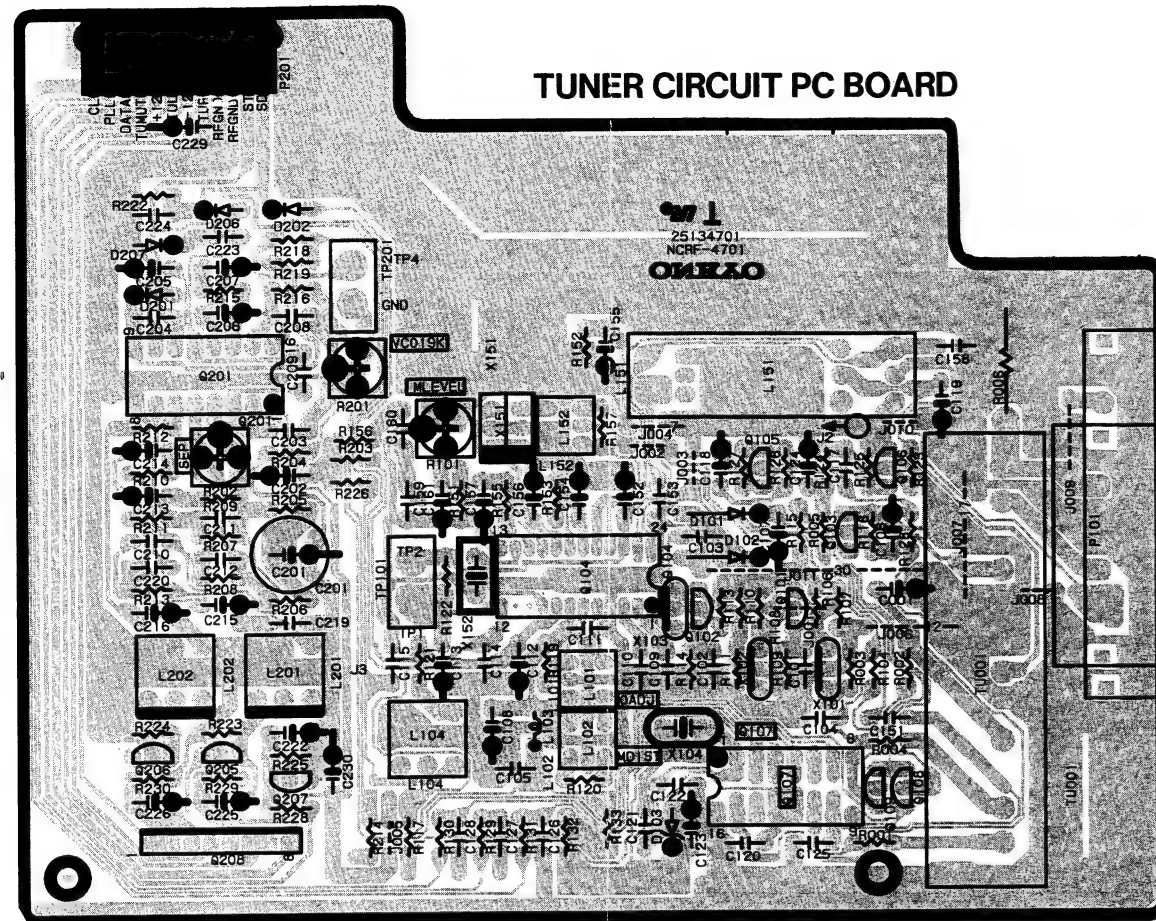
SURROUND CIRCUIT PC BOARD



RI/MR TER MINAL PC BOARD

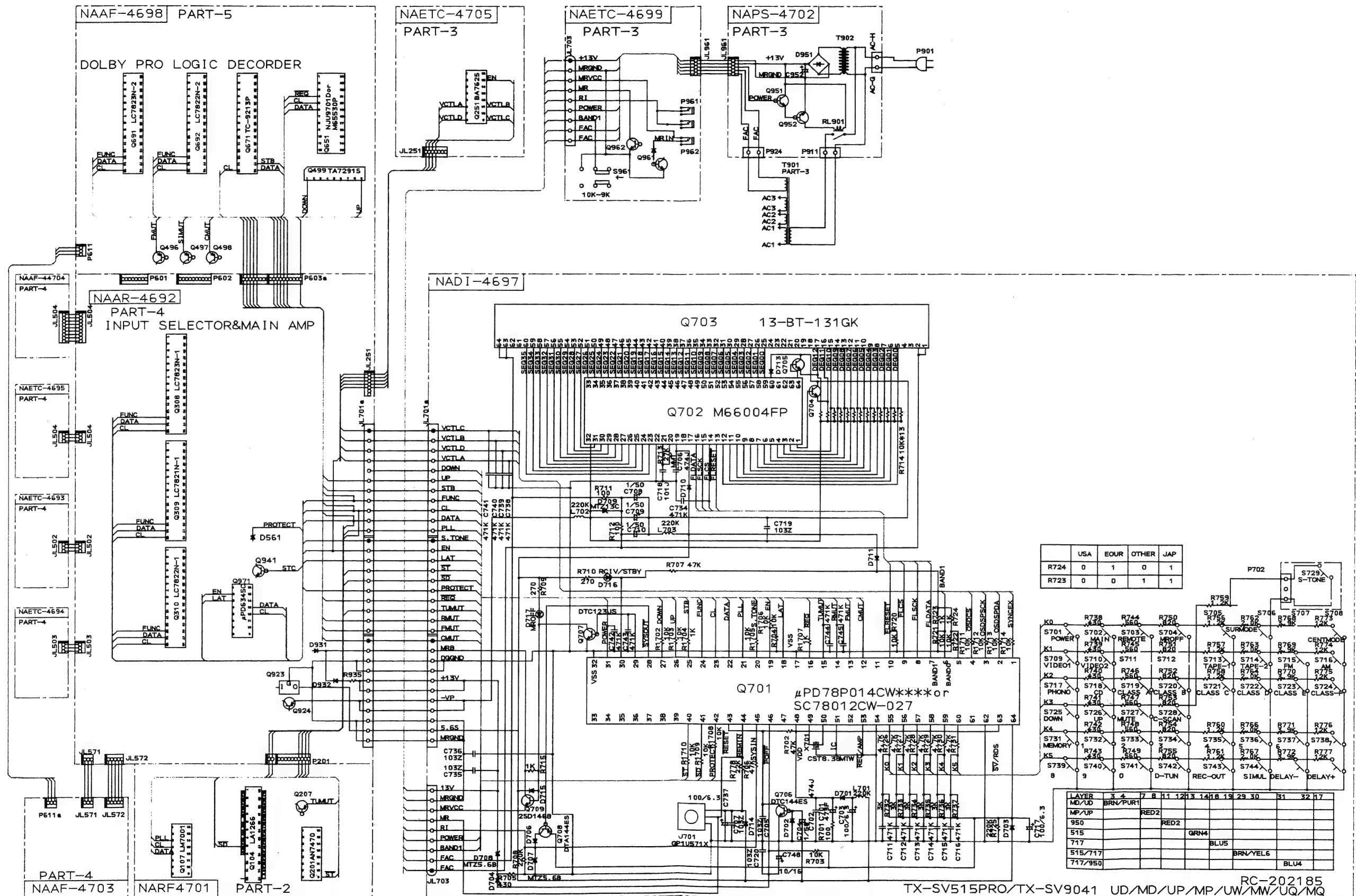


PRINTED CIRCUIT BOARD VIEW FROM BOTTOM SIDE



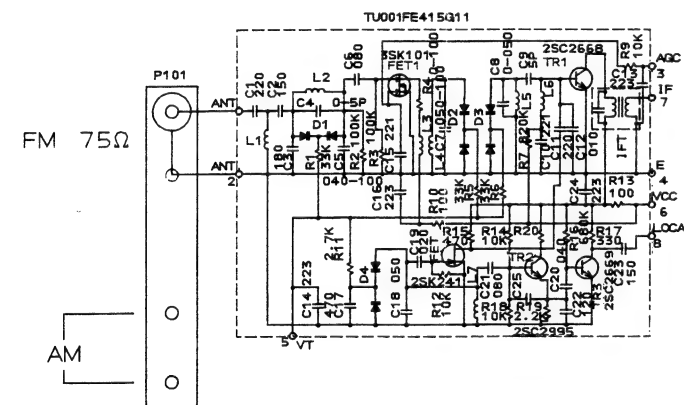
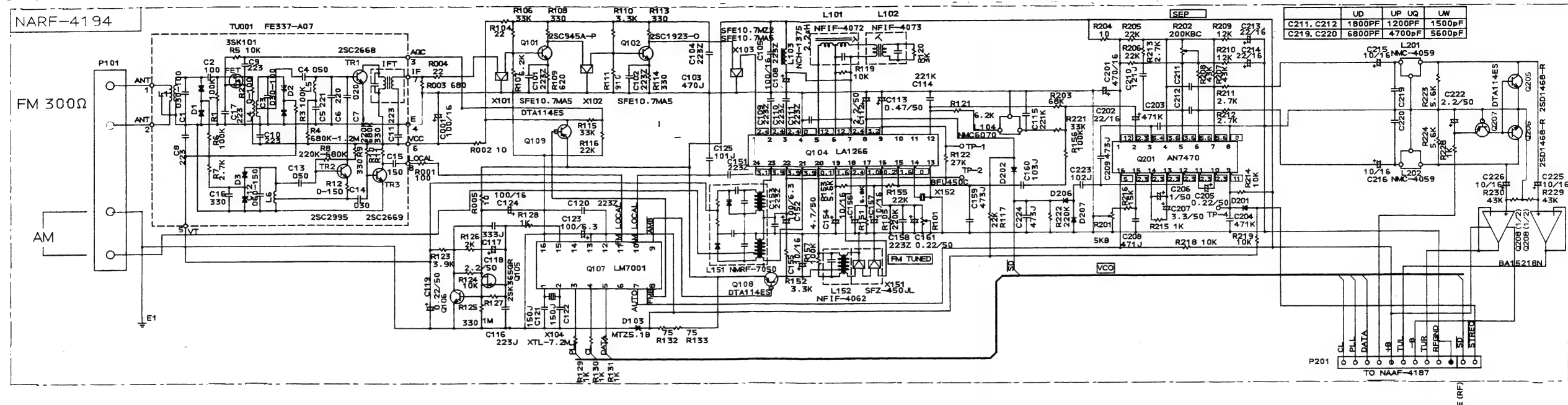
## SCHEMATIC DIAGRAM (PART-1)



### CONNECTION DIAGRAM OF MICROPROCESSOR



### SCHEMATIC DIAGRAM (PART-2)

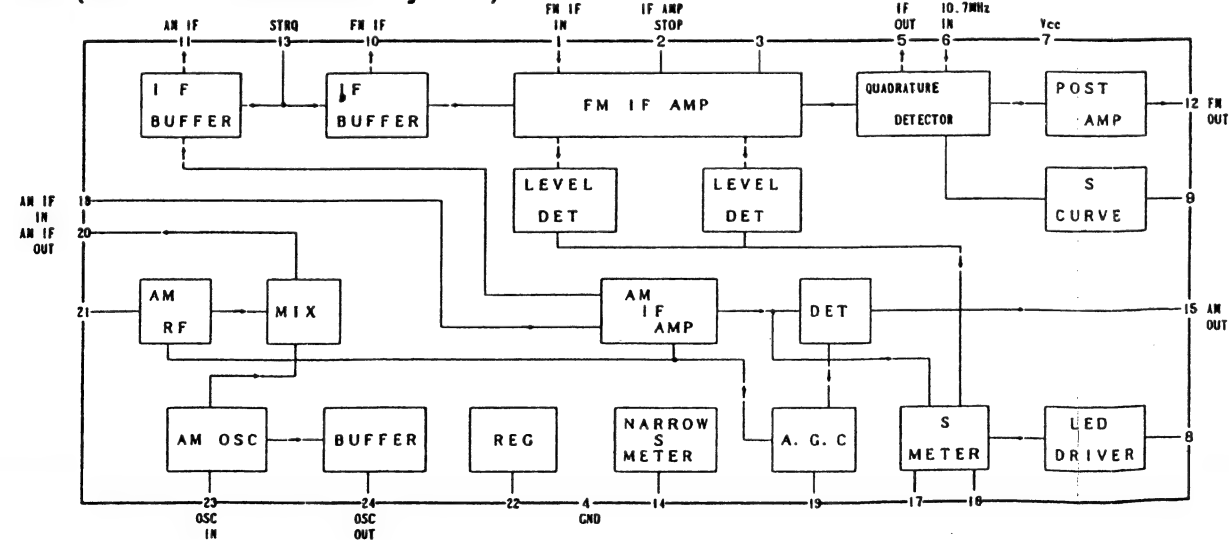
#### TUNER SECTION



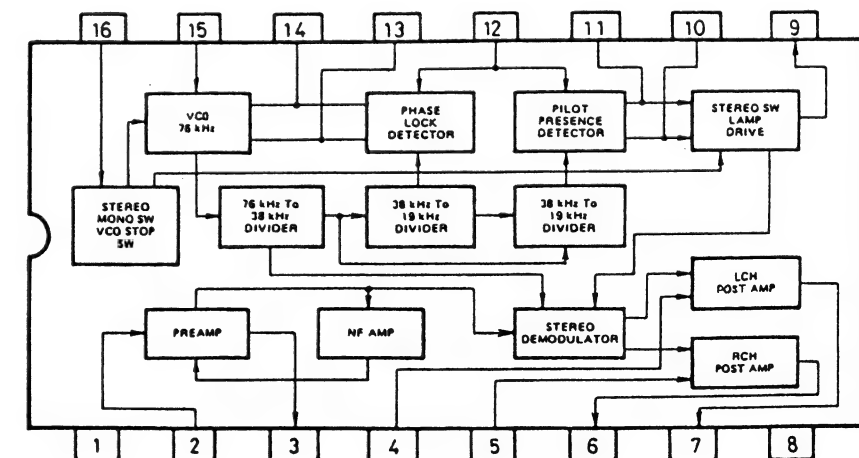
	MD, UD	MP, MW, MQ UP, UW, UQ
Q101 X102 R106-109 R121 R221 C101 C115	No parts	
R203		No parts
R111	910Ω	560Ω
TU001	FE337-A07	FE415-Q11
X103	SFE10.7MA	SFE10.7MZZ
X101 OUT- Q102 Emitter	Sorted with J001	

### Q401

#### LA1266 (FM IF and AM Radio System)



**Q201**  
**AN7470 (FM Stereo Decoder)**

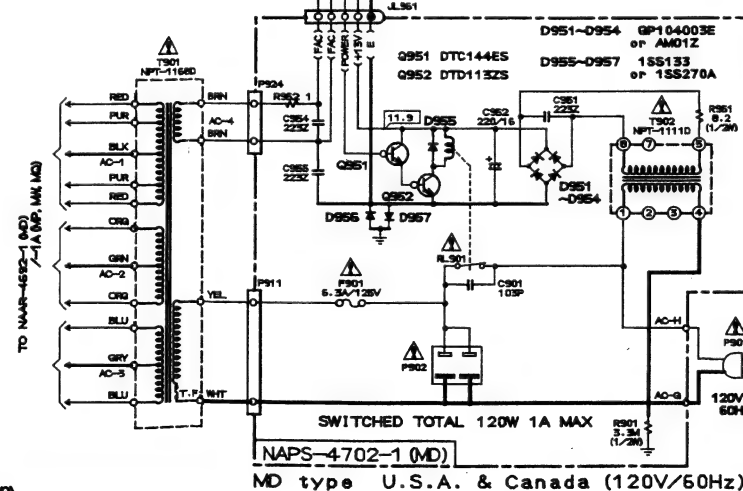
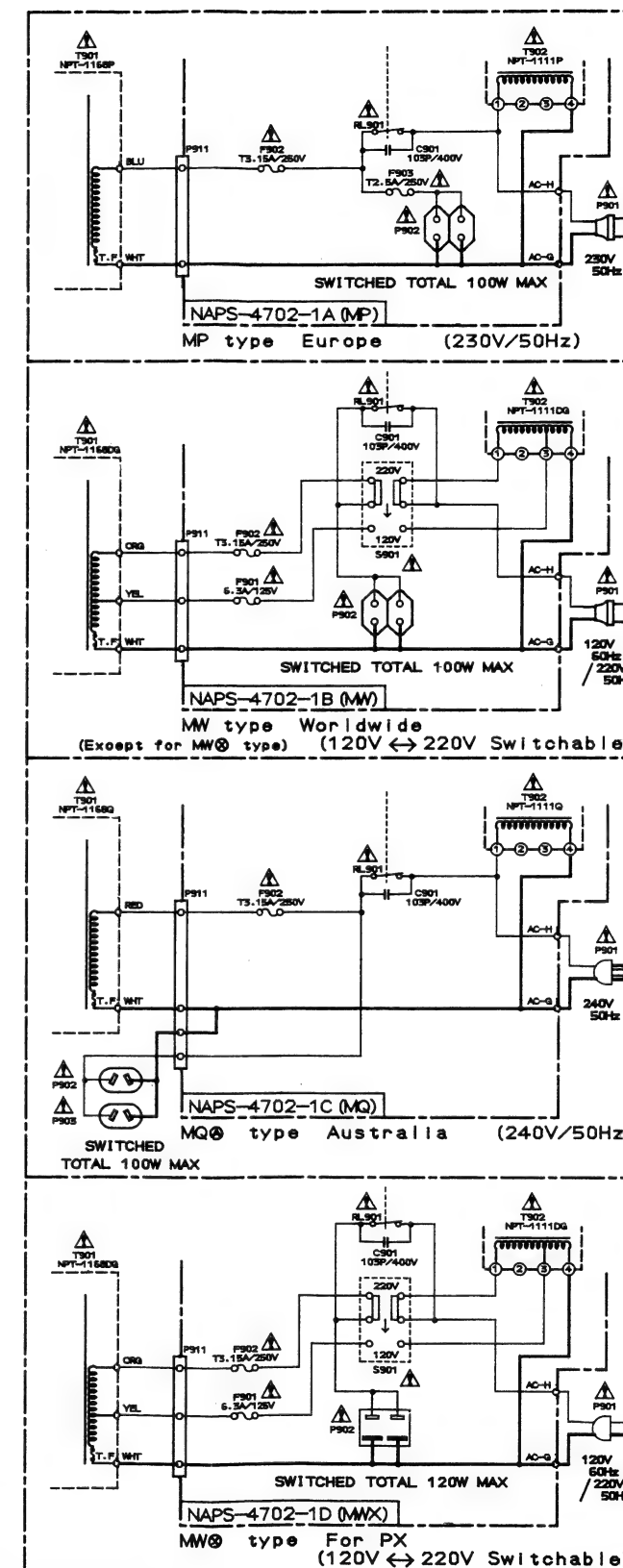
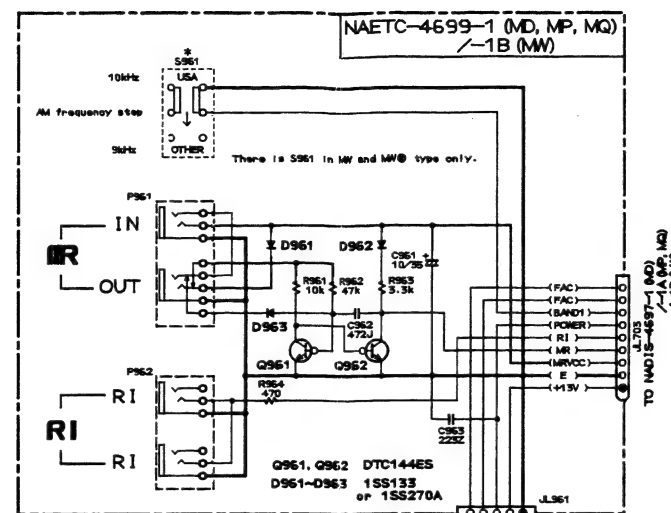
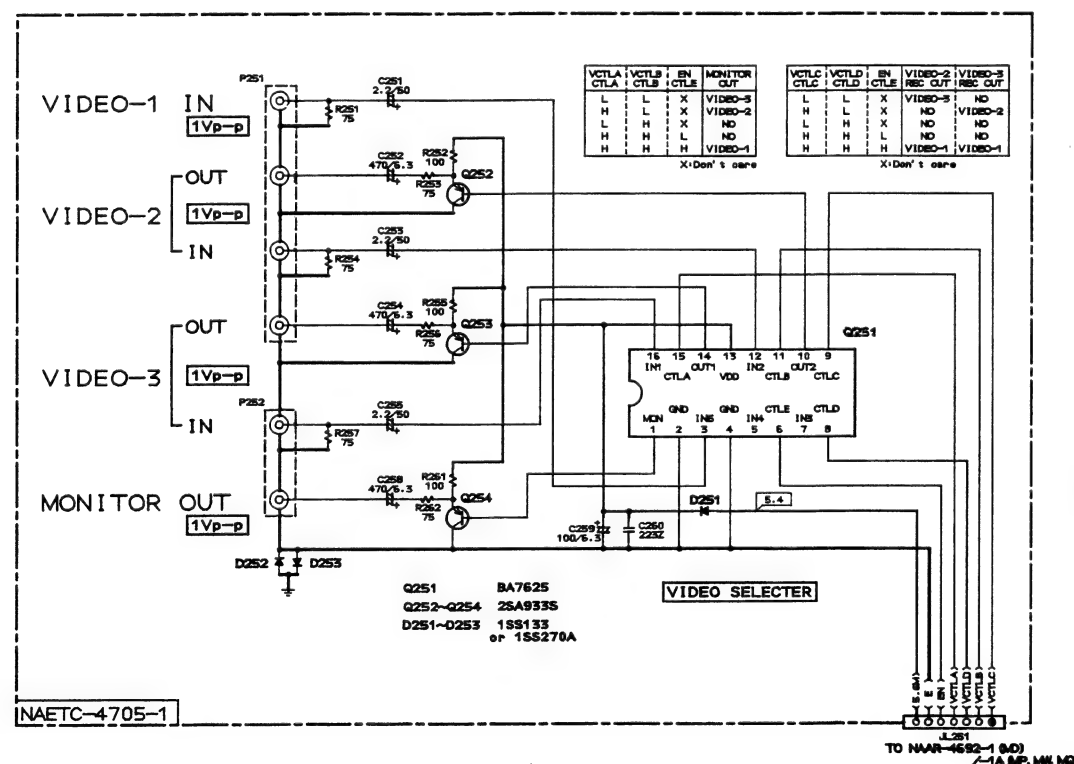
**ONKYO CORPORATION**



# SCHEMATIC DIAGRAM (PART-3)

## POWER SUPPLY AND VIDEO SECTION

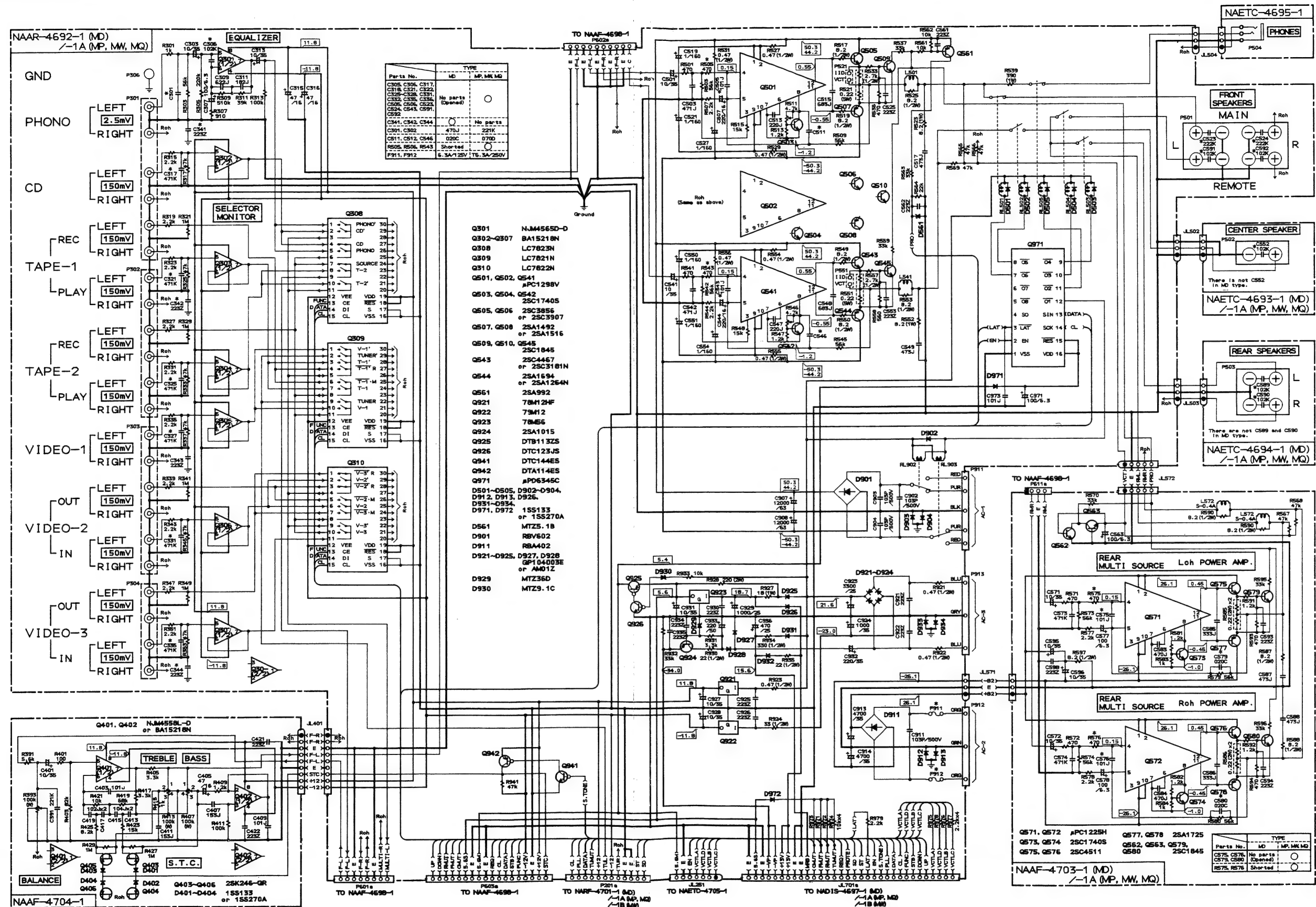
- MD type : 120V/60Hz Area  
 MDⓈ type : U.S.A.  
 MDⓈ type : Canada
- MP type : 230V/50Hz Area  
 MP type : Europe (except for Germany)  
 MPⓈ type : Germany (MODEL No. TX-SV9041)
- MW type : 120V or 220V Switchable  
 MW type : Worldwide  
 MWⓈ type : For PX
- MQ type : 240V/50Hz Area  
 MQⓈ type : Australia





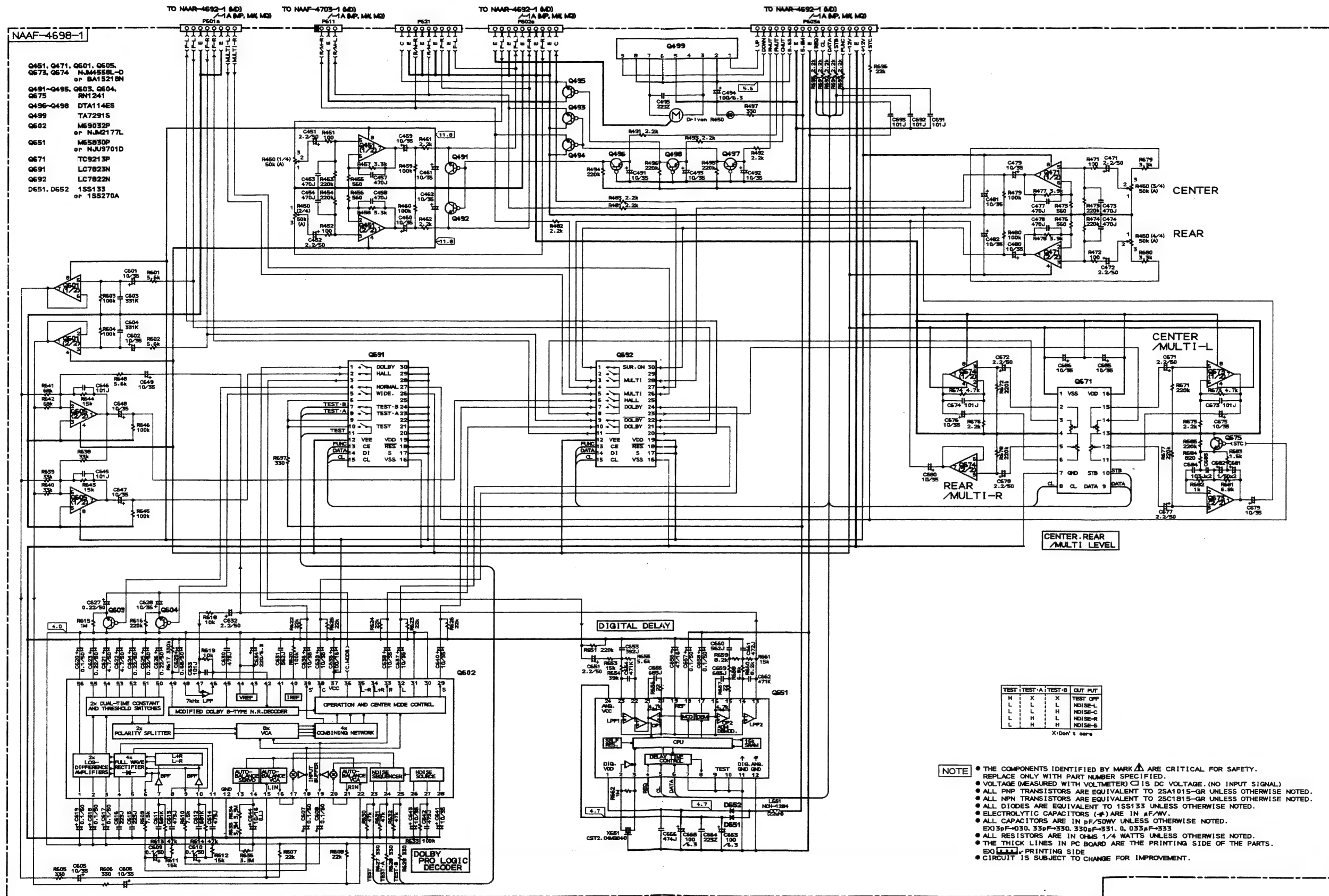
## SCHEMATIC DIAGRAM (PART-4)

### AUDIO SECTION



**ONKYO CORPORATION**

# SCHEMATIC DIAGRAM (PART-5) SURROUND SECTION



ONKYO CORPORATION

## PRINTED CIRCUIT BOARD PARTS LIST

CAUTION: Replacement for transistor of mark \*, if necessary,  
must be made from the same beta group (H Æ) as  
the original type.

NOTE: THE COMPONENTS IDENTIFIED BY MARK  $\Delta$   
ARE CRITICAL FOR RISK OF FIRE AND  
ELECTRIC SHOCK. REPLACE ONLY WITH  
PART NUMBER SPECIFIED.

## MAIN CIRCUIT PC BOARD (NAAR-4692-1/1A)

CIRCUIT NO.	PART NO.	DESCRIPTION	CIRCUIT NO.	PART NO.	DESCRIPTION
	ICs			Diodes	
Q301	22240191	NJM4565D-D	D912,D913	223205 or	1SS270A or
Q302-Q307	22240247	BA15218N	D926	223163	1SS133
Q308	22240339	LC7823N	D921-D925	22380046 or	AM01Z or
Q309	22240280	LC7821N	D927,D928	22380035	GP104003E
Q310	22240270	LC7822N	D929	224453604	MTZ36D
Q501,Q502	22240311	$\mu$ PC1298V	D930	224450913	MTZ9.1C
Q541	22240311	$\mu$ PC1298V	D931-D934	223205 or	1SS270A or
Q921	222780125NEC	78M12HF	D971,D972	223163	1SS133
Q922	222790125	79M12		Coils	
Q923	222780565JRC	78M56	L501,L502	231209S	S-0.4A
Q971	22240211	$\mu$ PD6345C	L541	231209S	S-0.4A
	Transistors			Capacitors	
Q503,Q504	2213284	2SC1740S-R	C303,C304	354761009	10 $\mu$ F,35V,Elect.
Q505,Q506	2201653,	* 2SC3856-O,	C307,C308	354721019	100 $\mu$ F,6.3V,Elect.
	2201654,	* 2SC3856-Y,	C309,C310	374726224	6200pF $\pm$ 5%,50V,Plastic
	2201655,	* 2SC3856-P,	C311,C312	374721824	1800pF $\pm$ 5%,50V,Plastic
	2202272 or	* 2SC3907-R or	C313,C314	354761009	10 $\mu$ F,35V,Elect.
	2202273	* 2SC3907-O	C315,C316	354744709	47 $\mu$ F,16V,Elect.
Q507,Q508	2201663,	* 2SA1492-O,	C501,C502	354761009	10 $\mu$ F,35V,Elect.
	2201664,	* 2SA1492-Y,	C503,C504	374724714	470pF $\pm$ 5%,50V,Plastic
	2201665,	* 2SA1492-P,	C507,C508	354742219	220 $\mu$ F,16V,Elect.
	2202262 or	* 2SA1516-R or	C515,C516	374726834	0.068 $\mu$ F $\pm$ 5%,50V,Plastic
	2202263	* 2SA1516-O	C517,C518	374724734	0.047 $\mu$ F $\pm$ 5%,50V,Plastic
Q509,Q510	2211732 or	2SC1845-F or	C519-C522	354700109	1 $\mu$ F,160V,Elect.
Q542	2213284	2SC1740S-R	C527,C528	354700109	1 $\mu$ F,160V,Elect.
Q543	2202253,	* 2SC4467-O,	C541	354761009	10 $\mu$ F,35V,Elect.
	2202254,	* 2SC4467-Y,	C542	374724714	470pF $\pm$ 5%,50V,Plastic
	2202256,	* 2SC4467-P,	C544	354742219	220 $\mu$ F,16V,Elect.
	2202502 or	* 2SC3181N-R or	C548	374726834	0.068 $\mu$ F $\pm$ 5%,50V,Plastic
	2202503	* 2SC3181N-O	C549	374724734	0.047 $\mu$ F $\pm$ 5%,50V,Plastic
Q544	2202243,	* 2SA1694-O,	C550,C551	354700109	1 $\mu$ F,160V,Elect.
	2202244,	* 2SA1694-Y,	C554	354700109	1 $\mu$ F,160V,Elect.
	2202246,	* 2SA1694-P,	C907,C908	3504258	12000 $\mu$ F,63V,Elect.
	2202492 or	* 2SA1264N-R or	C913,C914	3504213	4700 $\mu$ F,35V,Elect.
	2202493	* 2SA1264N-O	C923	354753329	3300 $\mu$ F,25V,Elect.
Q545	2211733	2SC1845-E	C924	354761029	1000 $\mu$ F,35V,Elect.
Q561	2211792 or	2SA992-F or	C927,C928	354761009	10 $\mu$ F,35V,Elect.
	2211793	2SA992-E	C929	354751029	1000 $\mu$ F,25V,Elect.
Q924	2211455	2SA1015-GR	C931	354761009	10 $\mu$ F,35V,Elect.
Q925	2213830	DTB113ZS	C932	354762219	220 $\mu$ F,35V,Elect.
Q926	2213640	DTC123JS	C933	354782219	220 $\mu$ F,50V,Elect.
Q941	221282	DTC144ES	C936	354754719	470 $\mu$ F,25V,Elect.
Q942	2213510	DTA114ES	C971	354721019	100 $\mu$ F,6.3V,Elect.
	Diodes			Resistors	
D501-D505	223205 or	1SS270A or	R511,R512	5210261	N06HR 5KBC,Trim
D902-D904	223163	1SS133	R517-R520	452530824	8.2 ohm,1/2W,Metal
D561	224450512	MTZ5.1B	R521,R522	4000132Y	0.22 ohm $\times$ 2.5W+5W,Metal plate
D901	22380038	RBV602	R523-R526	451630824	8.2 ohm,1W,Metal
D911	22380048	RBA402	R527-R532	452534794	0.47 ohm,1/2W,Metal
			R533,R534	442522724	2.7 kohm,1/2W,Metal oxide

CIRCUIT NO.	PART NO.	DESCRIPTION
	Resistors	
R539,R540	441623914	390 ohm,1W,Metal oxide
R546	5210261	N06HR 5KBC,Trim
R549,R550	452530824	8.2 ohm,1/2W,Metal
R551	4000132Y	0.22 ohm $\times$ 2.5W+5W,Metal plate
R552	451630824	8.2 ohm,1W,Metal
R553	452530824	8.2 ohm,1/2W,Metal
R554-R556	452534794	0.47 ohm,1/2W,Metal
R557	442522724	2.7 kohm,1/2W,Metal oxide
R921-R923	452534794	0.47 ohm,1/2W,Metal
R924	442523304	33 ohm,1/2W,Metal oxide
R927	441621804	18 ohm,1W,Metal oxide
R928	441722214	220 ohm,2W,Metal oxide
R930,R935	442522204	22 ohm,1/2W,Metal oxide
R934	442523314	330 ohm,1/2W,Metal oxide
	Relaies	
RL501	25065339	NRL-2P5A-DC24-046
RL502	25065379	NRL-1P5A-DC24-058
RL503,RL504	25065339	NRL-2P5A-DC24-046
RL505	25065470	NRL-2P1.25A-DC24-079
RL902,RL903	25065435	$\Delta$ NRL-1P10A-DC24-072
	Fuses	
F911,F912	252166Y	$\Delta$ 6.3A-UL/T-237 <D>
	252079	$\Delta$ 6.3A-SE-EAK <P/W/Q>
	Fuseholders	
F911A,F912A	25050065	$\Delta$ YSH403T
	Plugs	
P201A	25055500	NPLG-12P475
P601A	25055498	NPLG-8P473
P602A	25055499	NPLG-10P474
P603A	25055503	NPLG-18P478
	Terminals	
P301-P303	25045300	NPJ-6PDBL-159
P304	25045303	NPJ-4PDBL-162
P501	25060125	NTM-8PDMN058
	Wire traps	
JL401	25050531	NSCT-9P354
JL701A	25050612 or	NSCT-32P423 or
	25050705	NSCT-32P509

## CENTER SPEAKER TERMINAL PC BOARD (NAETC-4693-1/1A)

CIRCUIT NO.	PART NO.	DESCRIPTION
P502	25060114	NTM-2PDML-048,Speaker terminal

## SPEAKER TERMINAL PC BOARD (NAETC-4694-1/1A)

CIRCUIT NO.	PART NO.	DESCRIPTION
P503	25060161	NTM-4PDML-087,Speaker terminal

## HEADPHONE TERMINAL PC BOARD (NAETC-4695-1)

CIRCUIT NO.	PART NO.	DESCRIPTION
P504	25045255	YKB26-5009,Headphone terminal

## DISPLAY CIRCUIT PC BOARD (NADIS-4697-1/1A/1B)

CIRCUIT NO.	PART NO.	DESCRIPTION
	Remote control sensor	
U701	24130007	GP1U571X
	FL tube	
Q703	212120	13-BT-131GK
	ICs	
Q701	22240684	SC78012CW-027
Q702	22240685R9	M66004FP
	Transistors	
Q704,Q705	2213284	2SC1740S-R
Q706	221282	DTC144ES
Q707	2213640	DTC123JS
Q708	2213510	DTA114ES
Q709	2212794	2SD1468-R
	Diodes	
D701-D704	223205 or	1SS270A or
D706,D710	223163	1SS133
D707,D708	224450562	MTZ5.6B
D709	224451303	MTZ13C
D711	223205 or	1SS270A or
	223163	1SS133 <P/W/Q>
D713-D715	223205 or	1SS270A or
	223163	1SS133
D716,D717	225142	SEL2913K,LED
	Resonator	
X701	3010205	CST8.38MTW
	Coils	
L701-L703	233411K220	NCH-1387
	Capacitors	
C701	3000059	0.047F,5.5V,Super
C702,C706	375524744	0.47 $\mu$ F $\pm$ 5%,50V,Plastic
C703	353721019	100 $\mu$ F,6.3V,Elect.
C704	353780109	1 $\mu$ F,50V,Elect.
C708-C710	353780109	1 $\mu$ F,50V,Elect.
C717,C737	353721019	100 $\mu$ F,6.3V,Elect.
C748	353741009	10 $\mu$ F,16V,Elect.
	Resistor	
R714	49163103413	10 kohm $\times$ 13,1/10W,Array
	Switches	
S701-S704	25035548	NPS-111-S510
S706,S708	25035548	NPS-111-S510
S710-S728	25035548	NPS-111-S510
S731-S746	25035548	NPS-111-S510
	Wire trap	
JL701B	25050578	NSCT-32P389
	Plug	
P702A	25055510	NPLG-3P485
	Socket	
Q701B	25050912	NSCT-64P699
	Holders	
D712A,D716A	27190843	
Q703A	27190913Y	

NOTE: THE COMPONENTS IDENTIFIED BY MARK  $\Delta$  ARE CRITICAL FOR RISK OF FIRE AND ELECTRIC SHOCK. REPLACE ONLY WITH PART NUMBER SPECIFIED.

## SURROUND CIRCUIT PC BOARD (NAAF-4698-1)

CIRCUIT NO.	PART NO.	DESCRIPTION
	ICs	
Q451,Q471	22240247 or	BA15218N or
	22240293	NJM4558L-D
Q499	22240239	TA7291S
Q601,Q605	22240247 or	BA15218N or
Q673,Q674	22240293	NJM4558L-D
Q602	22240683 or	NJM2177L or
	22240692	M69032P
Q651	22240686 or	M65830P or
	22240687	NJU9701D
Q671	22240266	TC9213P
Q691	22240339	LC7823N
Q692	22240270	LC7822N
	Transistors	
Q491-Q495	2213631 or	RN1241-A or
Q603,Q604	2213632	RN1241-B
Q496-Q498	2213510	DTA114ES
Q675	2213631 or	RN1241-A or
	2213632	RN1241-B
	Diodes	
D651,D652	223205 or	1SS270A or
	223163	1SS133
	Coil	
L651	233411K220	NCH-1387
	Resonator	
X651	3010217	CST2.04MG040,Ceramic
	Capacitors	
C451,C452	354780229	2.2 $\mu$ F,50V,Elect.
C459-C462	354761009	10 $\mu$ F,35V,Elect.
C471,C472	354780229	2.2 $\mu$ F,50V,Elect.
C479-C482	354761009	10 $\mu$ F,35V,Elect.
C491-C493	354761009	10 $\mu$ F,35V,Elect.
C494	354721019	100 $\mu$ F,6.3V,Elect.
C601,C602	354761009	10 $\mu$ F,35V,Elect.
C605,C606	354761009	10 $\mu$ F,35V,Elect.
C607-C610	353781099	0.1 $\mu$ F,50V,Elect.
C613,C614	374724734	0.047 $\mu$ F $\pm$ 5%,50V,Plastic
C615,C616	374722234	0.022 $\mu$ F $\pm$ 5%,50V,Plastic
C617-C620	353781099	0.1 $\mu$ F,50V,Elect.
C621,C622	354780479	4.7 $\mu$ F,50V,Elect.
C623-C627	353782299	0.22 $\mu$ F,50V,Elect.
C628	354761009	10 $\mu$ F,35V,Elect.
C629	354786899	0.68 $\mu$ F,50V,Elect.
C630	374724734	0.047 $\mu$ F $\pm$ 5%,50V,Plastic
C631,C660	374725624	5600pF $\pm$ 5%,50V,Plastic
C632,C651	354780229	2.2 $\mu$ F,50V,Elect.
C634	354722219	220 $\mu$ F,6.3V,Elect.
C635	354741019	100 $\mu$ F,16V,Elect.
C636-C641	354761009	10 $\mu$ F,35V,Elect.
C642,C661	374724724	4700pF $\pm$ 5%,50V,Plastic

CIRCUIT NO.	PART NO.	DESCRIPTION
	Capacitors	
C643	354761009	10 $\mu$ F,35V,Elect.
C644	392841007	10 $\mu$ F,16V,Elect.
C647-C649	354761009	10 $\mu$ F,35V,Elect.
C653	374723924	3900pF $\pm$ 5%,50V,Plastic
C655,C659	374726834	0.068 $\mu$ F $\pm$ 5%,50V,Plastic
C656	354744709	47 $\mu$ F,16V,Elect.
C657,C658	353781099	0.1 $\mu$ F,50V,Elect.
C663,C665	354721019	100 $\mu$ F,6.3V,Elect.
C666	375524744	0.47 $\mu$ F $\pm$ 5%,50V,Plastic
C671,C672	354780229	2.2 $\mu$ F,50V,Elect.
C675,C676	354761009	10 $\mu$ F,35V,Elect.
C677,C678	354780229	2.2 $\mu$ F,50V,Elect.
C679,C680	354761009	10 $\mu$ F,35V,Elect.
C681,C682	354780109	1 $\mu$ F,50V,Elect.
C683,C684	374721034	0.01 $\mu$ F $\pm$ 5%,50V,Plastic
C685,C686	354761009	10 $\mu$ F,35V,Elect.
	Resistor	
R450	5144017Y	N16RQL50KA25F, Variable, Volume
	Sockets	
P601	25050445	NSCT-8P269
P602	25050446	NSCT-10P270
P603	25050450	NSCT-18P274
P611	2000802	NSAS-6P758
	Plug	
P621	25055411	NPLG-9P393

## RI/MR TERMINAL PC BOARD (NAETC-4699-1/1B)

CIRCUIT NO.	PART NO.	DESCRIPTION
	Transistors	
Q961,Q962	221282	DTC144ES
	Diodes	
D961-D963	223205 or	1SS270A or
	223163	1SS133
	Capacitors	
C961	354761009	10 $\mu$ F,35V,Elect.
C962	374724724	4700pF $\pm$ 5%,50V,Plastic
	Jacks	
P961	25045293	HSJ-1003-01-012
P962	25045172	HSJ-1003-01-020
	Switch	
S961	25065286	NSS-22112,AM band <W>
	Wire trap	
JL961	25050527	NSCT-5P350

## STC SWITCH PC BOARD (NASW-4700-1)

CIRCUIT NO.	PART NO.	DESCRIPTION
S729	25035548	NPS-111-S510,Switch
P702B	25050454	NSCT-3P278,Socket



NOTE: THE COMPONENTS IDENTIFIED BY MARK  $\Delta$  ARE CRITICAL FOR RISK OF FIRE AND ELECTRIC SHOCK. REPLACE ONLY WITH PART NUMBER SPECIFIED.

## TUNER CIRCUIT PC BOARD (NARF-4701-1/1A/1B)

CIRCUIT NO.	PART NO.	DESCRIPTION
	Front end	
TU001	240088	FE337-A07 <D>
	240089	FE415-G11 <P/W/Q>
	ICs	
Q104	22240039	LA1266
Q107	22240090	LM7001
Q201	22240242	AN7470
Q208	22240247 or	BA15218N or
	22240293	NJM4558L-D
	Transistors	
Q101	2210746	2SC945A-P <P/W/Q>
Q102	2211723	2SC1923-O
Q105	2212445	2SK365-GR
Q106	2213284	2SC1740S-R
Q108,Q109	2213510	DTA114ES
Q205,Q206	2212794	2SD1468-R
Q207	2213510	DTA114ES
	Diodes	
D103	224450512	MTZ5.1B
D201,D202	223205 or	1SS270A or
D206,D207	223163	1SS133
	Coils and transformers	
L101	233401	NFIF-4072
L102	233402	NFIF-4073
L103	233411M022	NCH-1375
L104	233383	NMC-6070 <P/W/Q>
L151	232148	NMRF-7050
L152	232139	NMIF-4062
L201,L202	233355A	NMC-4059
	Ceramic filters	
X101	3010071	SFE10.7MA5
X102	3010071	SFE10.7MA5 <P/W/Q>
X103	3010071	SFE10.7MA5 <D>
	3010130	SFE10.7MZ2A <P/W/Q>
X151	3010123	SFZ-450JL
X152	3010076	BFU-450C
	Resonator	
X104	3010158 or	XTL-7.2M,
	3010141	Crystal
	Capacitors	
C001	354741019	100 $\mu$ F,16V,Elect.
C108,C124	354741019	100 $\mu$ F,16V,Elect.
C112,C118	354780229	2.2 $\mu$ F,50V,Elect.
C113	354784799	0.47 $\mu$ F,50V,Elect.
C117	374723334	0.033 $\mu$ F $\pm$ 5%,50V,Plastic
C119,C161	353782299	0.22 $\mu$ F,50V,Elect.
C123,C152	354721019	100 $\mu$ F,6.3V,Elect.
C154	354780479	4.7 $\mu$ F,50V,Elect.
C155-C157	354761009	10 $\mu$ F,35V,Elect.
C159	374724734	0.047 $\mu$ F $\pm$ 5%,50V,Plastic

CIRCUIT NO.	PART NO.	DESCRIPTION
	Capacitors	
C160	374721034	0.01 $\mu$ F $\pm$ 5%,50V,Plastic
C201	354744719	470 $\mu$ F,16V,Elect.
C202	354742209	22 $\mu$ F,16V,Elect.
C205	354782299	0.22 $\mu$ F,50V,Elect.
C206	354780109	1 $\mu$ F,50V,Elect.
C207	354780339	3.3 $\mu$ F,50V,Elect.
C208	370134714	470pF $\pm$ 5%,100V,Plastic
C209,C224	374724734	0.047 $\mu$ F $\pm$ 5%,50V,Plastic
C211,C212	374721824	1800pF $\pm$ 5%,50V,Plastic <D>
	374721224	1200pF $\pm$ 5%,50V,Plastic <P/Q>
	374721524	1500pF $\pm$ 5%,50V,Plastic <W>
C213,C214	354742209	22 $\mu$ F,16V,Elect.
C215,C216	354761009	10 $\mu$ F,35V,Elect.
C219,C220	374726824	6800pF $\pm$ 5%,50V,Plastic <D>
	374724724	4700pF $\pm$ 5%,50V,Plastic <P/Q>
	374725624	5600pF $\pm$ 5%,50V,Plastic <W>
C222	354780229	2.2 $\mu$ F,50V,Elect.
C223	374721024	1000pF $\pm$ 5%,50V,Plastic <D>
	338324715	470pF $\pm$ 10%,50V,Ceramic <P/W/Q>
C225,C226	354761009	10 $\mu$ F,35V,Elect.
	Trim resistors	
R101	5210266	N06HR100KBC
R201	5210261	N06HR5KBC
R202	5210267	N06HR200KBC
	Terminal	
P101	25060160	NTM-4PDMN086 <D>
	25060117	NTM-2PDMN051 <P/W/Q>
	Socket	
P201	25050447	NSCT-12P271

## POWER SUPPLY CIRCUIT PC BOARD (NAPS-4702-1/1A/1B/1C/1D)

CIRCUIT NO.	PART NO.	DESCRIPTION
	Transistors	
Q951	221282	DTC144ES
Q952	2213650	DTD113ZS
	Diodes	
D951-D954	22380046 or	AM01Z or
	22380035	GP104003E
D955-D957	223205 or	1SS270A or
	223163	1SS133
	Power transformer	
T902	2300670Y	$\Delta$ NPT-1111D <D>
	2300671Y	$\Delta$ NPT-1111P <P>
	2300672Y	$\Delta$ NPT-1111DG <W>
	2300673Y	$\Delta$ NPT-1111Q <Q>
	Relay	
RL901	25065248	$\Delta$ NRL-1P15A-DC12-29
	Capacitors	
C901	3500065A	$\Delta$ DE7150FZ103PAC400/125V,IS
C952	354742219	220 $\mu$ F,16V,Elect.

CAUTION: Replacement for transistor of mark \*, if necessary, must be made from the same beta group (H FE) as the original type.

NOTE: THE COMPONENTS IDENTIFIED BY MARK  $\Delta$  ARE CRITICAL FOR RISK OF FIRE AND ELECTRIC SHOCK. REPLACE ONLY WITH PART NUMBER SPECIFIED.

CIRCUIT NO.	PART NO.	DESCRIPTION
Resistors		
R901	431523355	$\Delta$ 3.3 Mohm, 1/2W, Solid <D>
R951	452530824	$\Delta$ 8.2 ohm, 1/2W, Metal
Fuse		
F901	252166Y	$\Delta$ 6.3A-UL/T-237 <D/W>
F902	252076	$\Delta$ 3.15A-SE-EAK <P/W/Q>
F903	252075	$\Delta$ 2.5A-SE-EAK <P>
Fuseholders		
F901A	25050065	$\Delta$ YSH403T <D/W>
F902A	25050065	$\Delta$ YSH403T <P/W/Q>
F903A	25050065	$\Delta$ YSH403T <P>
AC outlet		
P902	25050409	$\Delta$ NSCT-4P234 <D>
	25050640	$\Delta$ NSCT-4P451 <P/W>
Switch		
S901	25065437	$\Delta$ NSS-22157P <W>
REAR AMPLIFIER PC BOARD (NAAF-4703-1/1A)		
CIRCUIT NO.	PART NO.	DESCRIPTION
ICs		
Q571, Q572	22240108	$\mu$ PC1225H
Transistors		
Q562, Q563	2211732 or	2SC1845-F or
Q579, Q580	2211733	2SC1845-E
Q573, Q574	2213284	2SC1740S-R
Q575, Q576	2202063,	* 2SC4511-O,
	2202064 or	* 2SC4511-Y or
	2202066	* 2SC4511-P
Q577, Q578	2202053,	* 2SA1725-O,
	2202054 or	* 2SA1725-Y or
	2202056	* 2SA1725-P
Coils		
L571, L572	231209S	S-0.4A
Capacitors		
C563	354721019	100 $\mu$ F, 6.3V, Elect.
C571, C572	354761009	10 $\mu$ F, 35V, Elect.
C577, C578	354721019	100 $\mu$ F, 6.3V, Elect.
C585, C586	374723334	0.033 $\mu$ F $\pm$ 5%, 50V, Plastic
C587, C588	374724734	0.047 $\mu$ F $\pm$ 5%, 50V, Plastic
C595, C596	354761009	10 $\mu$ F, 35V, Elect.
Resistors		
R585, R586	4000131Y	0.22 ohm $\times$ 2, 2W+2W, Metal plate
R587, R590	452530824	8.2 ohm, 1/2W, Metal
R597	452530824	8.2 ohm, 1/2W, Metal
Plug		
P611A	25055234	NPLG-3P218
Wire traps		
JL571	25050280	NSCT-3P108
JL572	25050282	NSCT-5P110

## TONE CONTROL CIRCUIT PC BOARD (NAAF-4704-1)

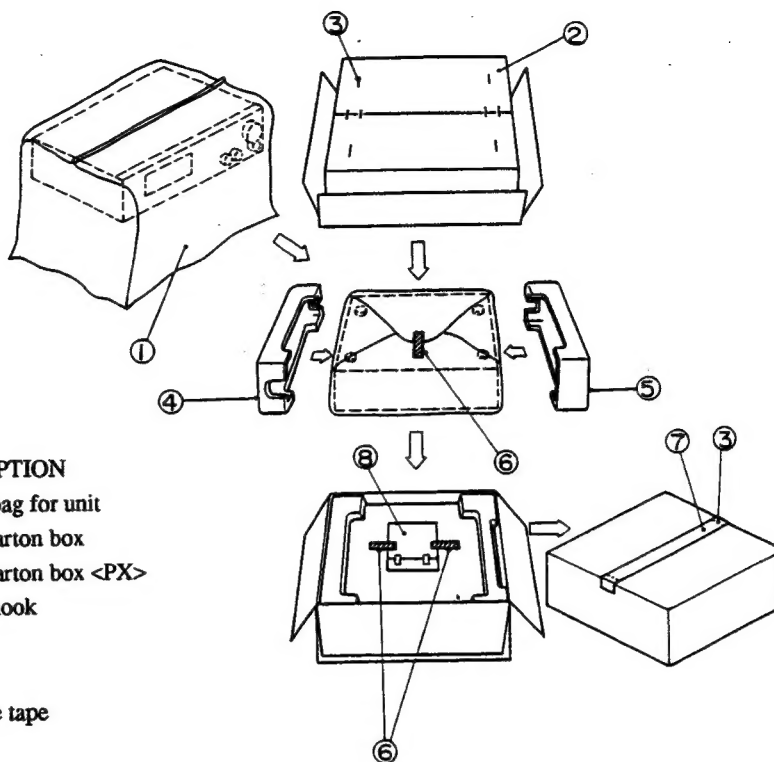
CIRCUIT NO.	PART NO.	DESCRIPTION
ICs		
Q401, Q402	22240247 or	BA15218N or
	22240293	NJM4558L-D
Transistors		
Q403-Q406	2211945	2SK246-GR
Diodes		
D401-D404	223205 or	1SS270A or
	223163	1SS133
Capacitors		
C401, C402	354761009	10 $\mu$ F, 35V, Elect.
C405, C406	354744709	47 $\mu$ F, 16V, Elect.
C407, C408	374721534	0.015 $\mu$ F $\pm$ 5%, 50V, Plastic
C411, C412	374721534	0.015 $\mu$ F $\pm$ 5%, 50V, Plastic
C413-C416	374721044	0.1 $\mu$ F $\pm$ 5%, 50V, Plastic
C417-C420	374721024	1000pF $\pm$ 5%, 50V, Plastic
Variable resistors		
R393	5104225	N11RGLC250KWT22Z, Balance
R407	5104230	N14RLC100KWT22Z, Bass
R413	5104230	N14RLC100KWT22Z, Treble

## VIDEO CIRCUIT PC BOARD (NAETC-4705-1)

CIRCUIT NO.	PART NO.	DESCRIPTION
IC		
Q251	22240373	BA7625
Transistors		
Q252-Q254	2213354	2SA933S-R
Diodes		
D251	22380046 or	AM01Z or
	22380035	GP104003E
Capacitors		
C251, C253	354780229	2.2 $\mu$ F, 50V, Elect.
C252, C254	354724719	470 $\mu$ F, 6.3V, Elect.
C255	354780229	2.2 $\mu$ F, 50V, Elect.
C258	354724719	470 $\mu$ F, 6.3V, Elect.
C259	354721019	100 $\mu$ F, 6.3V, Elect.
Terminals		
P251	25045339	NPJ-4PDYE-190
P252	25045395	NPJ-2PDYE-221
Wire trap		
JL251	25050529	NSCT-7P352

NOTE: <D>: 120V model Only  
 <P>: 230V/240V models Only  
 <W>: Worldwide model Only  
 <Q>: 240V model Only

## PACKING VIEW



REF.NO.	PART NO.	DESCRIPTION
1	29100034A	Styrene bag for unit
2	29052568Y	Master carton box
	29052574Y	Master carton box <PX>
3	282301	Sealing hook
4	29091615Y	Pad R
5	29091614Y	Pad L
6	261504	Adhesive tape
7	29110071	PP tape
8	Accessory bag ass'y	
	29341810Y	Instruction manual <D/PX>
	29341812Y	Instruction manual <P/W/C>
	29341845Y	Instruction manual <W>
	292111	FM antenna <D>
	292112	FM antenna <P/W>
	232140	NMA-3057, AM loop antenna
	2010200	Connection cord
	3010054	UM-3, Two batteries
	24140252Y	RC-252S, Remote control transmitter
	25065462	YAE21-0237, FM adaptor <W/F>
	25055018	CV-K-1, Conversion plug <W>
	25055251	CV-CP, Conversion plug <PX>
	29365019A	Warranty card <N>
	29365024A	Warranty card <F>
	29365021	Warranty card <PX>
	29358002J	Service station list <N>
	29100097	Styrene bag for accessory
	29100107	Styrene bag for warranty card <F>

NOTE: <D>:120V model only  
 <P>:230V/240V models only  
 <W>:Worldwide model only  
 <F>:French model only  
 <PX>:PX model only  
 <C>:Canadian model only

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